Discourse Markers in Computer Science Seminar Talk

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Chapter 1
Introduction

1.1 Introduction

The study of institutional talk, or talk at work, is an increasingly important area of research. The term institutional talk refers to the analysis of interaction in a range of institutional settings. It takes as its departure point the analysis of everyday conversation, in that it attempts to describe and assess ways in which institutional talk is similar to, yet differs from, ordinary everyday conversation. A variety of institutional settings have been researched using a range of discourse analysis methods, including news interview discourse (e.g. Heritage 1985, Heritage and Greatbatch 1991), doctor-patient interaction (e.g. Psathas 1990, ten Have 1991, Jefferson and Lee 1992), courtroom talk (e.g. Drew 1985, 1992, Watson 1990), classroom discourse (e.g. Coulthard 1977, Mehan 1985), job interviews (e.g. Button 1992, Gumperz 1992) and scientific interaction (e.g. Ochs, Gonzales and Jacoby 1996).

One area of institutional talk that has not been the focus of detailed attention is the way in which native speakers structure seminar presentations within the institutional setting of a university or research institute. This thesis analyses how presenters of computer science seminars use a variety of discourse techniques, including talk, body movement, prosody, and interaction with tools, such as overhead slides, computers, and videos, to structure their talk. This is in keeping with work by Ochs, Gonzales and Jacoby (1996:329) who show how 'scientists build meaning through routine interpretive activity involving talk, gesture and graphic representation'. Therefore, scientific discourse can only be fully understood by examining the relationship between talk, activity and action.

The aim of this thesis is to examine scientific talk at this higher level of organisation, by looking at the interaction of vocal and non-vocal activities within the context of the extended monologue. It examines the way in which presenters use particular lexical items (*okay, so, uhm*) in combination with body movement, prosody, and interaction with tools to structure their material, such that the seminar is an ordered, coherent piece of academic discourse. *Okay, so* and *uhm* occur in specific, predictable environments within seminars, and an examination is made of how they function in these environments. It is argued that *okay, so,* and *uhm* function as discourse markers in computer science seminar talk, in that they indicate the structure of the seminar to the listening audience. Because *okay, so* and *uhm* can co-occur within the same environment, emphasis is placed on teasing out the

function of the individual discourse markers, thus enabling a discussion of how they function in combination.

1.2 Institutional Talk

Conversation analysis (CA) describes and explicates 'the competences that ordinary speakers use and rely on in participating in intelligible, socially organized conversation' (Atkinson and Heritage, 1984:1). In other words, it is concerned with the detail of how people use talk and non-verbal means to interact with each other and the world around them. CA acknowledges the importance of context in which a particular interaction takes place. As a result, all aspects of linguistic behaviour are relevant or significant, including lexical choice, prosody, phonology as well as non-verbal information such as eye gaze, or interaction with external physical objects (Gumperz 1982, Goodwin 1996, Ochs, Gonzales and Jacoby 1996).

Heritage (1989:21) outlines four fundamental assumptions of CA. First, interaction is structurally organized. This means that talk is ordered, rather than a series of random utterances. Second, contributions to interaction are both context-shaped and context-renewing. Contributions cannot be understood without reference to the context in which they occur, in particular to the immediately preceding context (context-shaped). As the interaction proceeds, an utterance then forms the immediate context for the following utterance (context-renewing). As a result of the first two assumptions, the third assumption is that no detail of conversation can be dismissed as *a priori* disorderly, accidental or interactionally irrelevant. This leads onto the final assumption that the study of social interaction is best approached through analysis of naturally occurring data. The aim of CA (Sacks, 1984:413) is to subject the actual, naturally occurring conversation to analysis in order to yield the 'technology' of the conversation.

It is within the context of CA that many of the studies of institutional talk are based. CA provides a useful point of departure because it is possible to look at how participants modify everyday conversation to meet the needs and requirements of their particular institution (Sacks, Schegloff and Jefferson 1974:729). When comparing conversation and institutional talk, it is important not only to identify things that are done differently, but to specify the differences precisely and to demonstrate that the differences are due to the institutional setting (Drew and Heritage 1992:20). Schegloff (1992:111) argues that a connection has to be made between the fact that the talk is being conducted in a particular setting and how that setting affects the shape, form, trajectory, content or character of the interaction. The task of the analyst is to show how the institutional nature of the setting

itself defines the way in which talk can occur, by examining how the form of the institution dictates the distribution of talk and the turn-taking mechanism. It is also necessary to examine the roles played by the participants, to show how they are oriented to the particular identities of the institutional setting. However, Schegloff (1992:117) warns that not everything *in* the setting is *of* the setting. Not all parties are oriented to the work setting and even if they were, the setting may not directly contribute to the production of institutional talk. In other words, the talk may not be 'procedurally consequential' (Schegloff 1992:117).

The important point for the analyst is therefore to show the connection between the setting and the talk and to realise that it is not the context that supplies the setting for the talk, but the participants who create the context (Schegloff 1992:124). In the case of seminar talk, although it would appear that the institutional setting of the seminar automatically provides the context for seminar talk, it is in fact the participants themselves who, by virtue of the way in which they organize the talk, constantly reaffirm the fact that they are participating in a seminar. As a result, talk is organised in a special way. Turn-taking is suspended, which means that there is no potential next speaker, although there is acceptance of the possibility, in this particular set of seminars under study, that audience members may interrupt during the extended turn.[1] Interruptions would appear to provide the potential for participants to move out of seminar talk and into ordinary conversation. However, as stated above, it is the participants who create the context and this can be demonstrated by the following example which illustrates how a participant, a member of the audience in this case, reminds the seminar that they have deviated from the point and, in so doing, have moved out of seminar talk (Example 1). The transcription conventions for this and following examples can be found at Appendix 1.

Example 1
[Mi:29]

Pres: (1.5) ((new image))
uhm¿ what i've done on this graph, ((goes over to screen)) is is basically plot (.) uhm (.) the (.) again ((points to screen)) displacement¿ and time¿ for different volumes. ↑now this this ((points to screen)) one here¿ is for half a litre¿ this ((points to screen)) one here¿ this one (.) second from the top, is for one litre¿ the top ((points to screen)) one¿ is for one and a half litres¿ and this ((points to screen)) one (.) just in here¿ is for two point two and a half. no two litres, sorry¿ in a three litre bottle.↓ »so as you can see (.) uhm (.) <without actually attempting to optimize it¿ around one and a half litres. which is <u>half</u> the volume of the bottle.> <u>seem</u>s to be about right. ((goes back to computer))

Aud1: isn't the critical thing there not the displacement when you exhaust the water but the velocity when you exhaust the water.

[1] We shall see later in the analysis that although interruptions are permitted, they are still structurally organised, in that they occur at 'acceptable' places.

	Pres:	it's probably (.) well I think what's happening, is that (.) this is don's theory¿ is that your consuming space for compressed air, which is eventually reducing the amount of energy that you can store in the system. and that's limiting the performance.
	Aud1:	yeh. but I mean the thing that you want to measure is not how far the rocket is gone when you run out of water
	Pres:	oh no this is this is the full flight. (.) this is flight from from zero time¿
	Aud1:	oh okay.
	Pres:	all the way up¿ this is this is 85 meters.
	Aud1:	right.
	Pres:	and this is uhm eight seconds. sorry¿
	Aud1:	okay.
(1) —›	Aud2:	the revolutionary new step in rocket design that you want to take, is actually to set fire to the propellor. ((laughter)) calculate the temperature at which the water you know ( ).
	Pres:	well there have been s s suggestions, instead of blowing it up with uhm with compressed gas, we actually again use acetyloxygen trick, and we set fire to that mixture, inside the bottle, as a source of pressure¿ hh
(2) —›	Aud3:	but I find these sort of things sort of deviate from the point. ((laughter)) the [idea is uh (water, air,])
(3) —›	Pres:	[((new image)) °okay.°] (3.0) ((more laughter))
(4) —›	Pres:	↑okay. the other thing you can do with the model,↓ <i've got to hurry along, because i'm already over time,> uhm¿ is the effect of drag¿ ↑drag is terribly important. uhm¿ and you need to,↓ even just by ((picks up bottle)) observation. this sort of bottle, is not as good as a bottle that's got some sort of uhm (.) str (.) aerodynamic streamlining on the front. ((puts back))

The example shows an extended Q-A routine between Aud1 (a member of the audience) and Pres (the presenter). Another member of the audience (Aud2 at arrow 1) then makes a funny comment which is taken up and elaborated on by the presenter. It is at this point that the talk ceases to be seminar talk and reverts to a more conversational form. At arrow 2, however, we see that Aud3 gently reminds the seminar that they are deviating from the point. The presenter accepts the reminder by closing off the interruption and returning to seminar talk. He closes off the interruption by putting a new image on the screen, saying a quiet *okay*, pausing until the audience settles, before launching into his next point with raised pitch voice (arrows 3, 4). This example clearly shows how it is the participants themselves who generate the context of being part of a seminar, by being subject to the organisational constraints of what it means to participate in a seminar in an academic setting. It is the form of talk that informs us, the analyst, as to the context (Schegloff 1992:127).

The institutional nature of seminars conforms to a number of criteria set out by Drew and Heritage (1992: 21-25) as to what it is that makes particular discourse institutional talk rather than ordinary conversation. Firstly, institutional talk should be goal-oriented in institutionally relevant ways. In the case of the seminar, participants are oriented to the goal of having a forum to present current academic research to colleagues. Secondly, the conduct of the participants is shaped by the constraints of the particular institutional setting.

In seminars, there are a number of constraints. Turn-taking is generally suspended, except in the case of interruptions as discussed above. Seminars follow a prescribed format, whereby the chairperson hands over to the presenter, there is an extended monologue with a specified time-limit, following which, the presenter hands the floor back to the chairperson. Presenters are required to present their material in a 'digestible' form, which may include the use of visual aids. Thirdly, the special character of inference in institutional settings deals with the way in which participants are required to maintain or reaffirm the context in ways specific to the institutional setting. We saw in Example 1 how a member of the audience was able to reaffirm the fact that they were participating in a seminar in a way that was acceptable within the context of that seminar.

In seminar talk, locally managed turn-taking is suspended. One of the consequences of a different turn-taking organisation is that the speaker has to present an extended monologue for up to an hour. As a result, the speaker has to carefully organise the way in which the material should be presented, with the structure of the talk being clear both to the speaker and to the audience. Subsequent analysis will show that the use of discourse markers is one way in which the speaker can inform the audience as to the structure of the talk. CA is a powerful tool for examining the role and function of the discourse marker as a structuring device and its integration with non-vocal activities, such as gaze, gesture and interaction with tools (computers, videos, overhead projectors). In particular, by comparing the way in which discourse markers function in ordinary conversation with how they function in seminar talk, it will be possible to define their patterns of use in seminar talk.

1.3 Scientific Language

Studies into the way in which scientists communicate have generally focussed on written communication. Swales (1990), for example, uses genre analysis to discuss the rhetorical function of the scientific research article. Other studies examine specific features of scientific discourse in terms of the grammar of the language. Differences in syntactic structure have been the subject of a large number of studies (see for example Curnow 1995, Thomas and Hawes 1994, Liddicoat 1992, Swales 1990, Malcolm 1987, Tarone *et al* 1981), as has the choice of lexicon in scientific discourse (Lerat 1995, Love 1993, Swales 1990, Phal 1968).

Fewer studies have been carried out in the area of spoken scientific discourse. A few recent studies examine the issue of scientific talk at the lower lexical level of discourse by looking at the use of scientific vocabulary in lectures (Jackson and Bilton 1994, Arden-Close 1993, Flowerdew 1992). These studies are predominately concerned with the issue of lecture

comprehension for non-native speakers. The graduate seminar (Weissberg 1993) and lecture introductions (Thompson 1994) have also been analysed in terms of Swales' (1990) genre-analysis of the written scientific research article. The occurrence of visual aids is a common feature in scientific talk. Dubois (1980) discusses the important structuring role of slides in biomedical speeches, both in terms of the slides themselves and the language used to regulate the slides. Coulthard and Montgomery (1981:37) discuss the use of visual aids in scientific and engineering monologues, and suggest it be called 'paradiscourse', in that it runs parallel to the monologue. However, in choosing to analyse discourse and paradiscourse as two separate, yet parallel, entities the analyst may miss what is really going on. This thesis will show that talk is closely integrated with physical activities, in particular, interacting with the slides on the overhead projector or computer. Verbal activity cannot be understood without taking into account non-verbal activity, because talk and activities surrounding the talk interact and work together. They cannot be fully understood in isolation.

Such a view, in which talk is seen as being intregrated with the activities surrounding the talk, is evident in recent discussions by Ochs, Gonzales and Jacoby (1996) and Goodwin (1994, 1996), who place emphasis on the grammar of a language as not being divorced from the discussion of the activities surrounding the language, that is, the talk itself. In fact, Goodwin (1996) widens the scope of the term 'grammar' from simply referring to what is involved in the structure of a well-formed sentence, to include the activities which surround the talk. Scientific interaction is therefore seen as being affected not only by choice of lexicon and syntax, rather it is affected at all levels of discourse. Ochs, Gonzales and Jacoby (1996) argue that in scientific interaction grammar works together with graphic representation and gesture to enable scientists not only to communicate about the objects they study, but also to identify with the objects themselves. They argue that the dichotomous view of formal scientific discourse being objective, and informal scientific discourse being subjective is semantically conservative and does not account for the way in which scientists relate to and identify with the objects they study. They conclude by arguing for a wider view of grammar as 'the interactional achievement of participants who creatively adapt language to their larger communicative needs' (Ochs, Gonzales and Jacoby 1996:360).

Goodwin (1994) examines how participants within a particular scientific community create a 'professional vision' as the focus of professional activity and discourse. He examines three practices which participants apply to create and build such a 'professional vision'. Firstly, how observed phenomena can be transformed into 'objects of knowledge' as a way of animating professional discourse. Secondly, how by highlighting aspects of a complex perceptual field, particular objects can be given saliency, thus enabling the scientist to draw

attention to important points. Thirdly, how material or graphic representations are produced and articulated within the discourse community. As a result, the 'professional vision', accomplished through 'the competent deployment of a complex of situated practices in a relevant setting', enables different professional communities to see, discuss and manipulate different kinds of events (Goodwin 1994:626).

An important aspect of this thesis is to examine scientific talk at this higher level of organisation, by looking at the interaction of vocal and non-vocal activities in scientific talk within the context of the extended monologue. Scientists build meaning through a combination of activities by creatively adapting language to their larger communicative needs (Ochs, Gonzales and Jacoby 1996:360). They are not only taking the resources of everyday language to express their scientific message (Phal 1968, Liddicoat 1997), they are combining *all* aspects of discourse, including syntactic position, intonation and body movement into a coherent course of collaborative action (Goodwin 1996:371). Scientists are not merely mirroring spoken language but are complementing it, by organising ideas via the use of graphic representations, in ways the spoken word cannot. By placing emphasis on important points on diagrams, tables, graphs, videos, or photographs, the audience can be guided through the relevant points of the argument (Goodwin 1994:611).

Previous research into scientific talk has mainly concentrated on lexical and syntactic differences in written discourse. The scientific monologue in the form of an academic seminar presentation, taking into account the way in which scientists use all the resources of conversation and adapt them in ways to suit their communicative purpose, has not been examined. This thesis examines the way in which computer scientists use the resources of everyday language, in the form of discourse markers and the activity which surrounds them, to structure a seminar presentation.

1.4 Academic monologues: Seminar talk

Goffman (1981) talks about the institutionalised nature of the monologue, in the form of a lecture. He discusses the notion of 'frames' (Goffman 1974, 1981) which are seen as the definition participants give to their current social activity. He also discusses, with reference to monologues, the notion of 'footing' (Goffman 1981). A change in footing implies a change in a participant's alignment or stance towards a proposition as indicated by the way the utterance is managed or expressed (Goffman 1981:128). Important for the current work on discourse markers is the notion that participants negotiate frames and communicate changes in footing through cues and markers in speech (Goffman 1981:157). These cues

or markers could include syntax, choice of lexical items, intonation, tone shifts, pitch, volume, rhythm, and stress.

Coulthard and Montgomery (1981:31-39), in discussing the structure of a monologue in relation to classroom discourse, see a lecture as consisting of three units. There is the 'transaction', referring to how the lecturer signposts prior and subsequent action. 'Sequences' refer to smaller-scaled topic units, characterised intonationally by a move from a high key at the start of the topic unit to a low key termination. 'Members', isolated on syntactic criteria, enable the main discourse to be differentiated from the subsidary discourse, such as glosses or asides. As mentioned above, they also discuss the important role played by visual displays, referring to it as 'paradiscourse' in that it runs parallel to the monologue and both shapes, and is shaped by, the discourse.

Brown & Yule (1983b:94-106) discuss the way in which speakers indicate topic-shift in spoken discourse by use of 'paratones', resembling the visual paragraph-initial indentation of a written paragraph. The introductory expression at the beginning of a paratone, indicating the topic of what is to follow, is generally made phonologically prominent, with the first clause or sentence said with raised pitch. The end of a paratone is generally marked by low pitch, loss of amplitude and a lengthy pause, similar to the what occurs at a transitional relevance place as part of the turn-signal in ordinary conversation (Sacks, Schegloff, Jefferson 1974).

Chafe (1979) also discusses this concept of verbal paragraphs in his flow model description of spontaneous spoken speech. He analyses the way in which subjects describe a visual event after they have seen it on a screen. As the speaker makes the transition from one focus to the next or from one thought to the next, there is generally a break in the coherence. If the transition is particularly difficult, as in the case of making a shift in terms of space, time, characters, events or worlds, the break is conspicuous, as evidenced by hesitation, stumbling and pauses. Chafe likens these boundaries, between one thought and the next, to paragraphs in written language. He interprets the pauses and hesitations which occur at the episode boundary as being due to processing difficulties. In his data, the length of pauses (including verbal hesitation markers, such as *uhm* and *uh*) which occur at the episode boundary had a mean length of 4.13 seconds. This contrasts with the 'standard maximum' silence in conversation of about 1 second (Jefferson 1989), and between sentence pauses in reading of about 1.0 - 1.24 seconds (Butterworth 1980).

Analysis of seminar talk data shows a similar feature, with segments of talk being surrounded by lengthy pauses. The segments of talk that emerged from the data appear to be important in that they display certain recurrent features, relating to choice of lexical items

(discourse markers), prosody (intonation, pitch, volume) and physical activity (interaction with overhead slide). The following example (Example 2) illustrates how segments of talk are surrounded by lengthy pauses.

Example 2
[Ma:19]

(1.5)
uhm¿ (1.0) ((puts new slide onto OHP. title: "General bundle model"))
↑and here maybe is a↓ (.) some algebra for a generalised uh (1.0) uh property, generalised version of that¿ uh which is really just defining a section »as i've said of pairs °which is a function model.° ((takes slide off)) °details aren't ((puts slide onto pile)) really important.°

(2.5)
t! ↑OKAY. SO ((puts new slide onto OHP. title: "The change of space")) ONE THING THAT I I HAVEN'T MENTIONED YET, AND WHICH I THINK ((walks over to 2nd OHP)) IS ACTUALLY REALLY IMPORTANT¿ uh is this arrow here. (.) ((points to OHP)) which is the change of space. (.) ((walks back)) uhm (1.0) .h now what that's about, is uh as i sort of alluded to earlier¿ it's not always the case that you find your ((points to OHP)) information space here¿ we find a scene that's directly isomorphic to it and that's it as the end of your display. it's often the case that you need to start in one information space and transform uhm to a different space. in order to make sense. now here are some cases where that has to happen¿ first of all if the uh information spaces out here¿ ((points to OHP)) where the where there aren't any isomorphic scene spaces. you have to find a mapping to one here¿ but often the just the task that you want to perform¿ uh »requires a different structure than the one that you started with.↓ uhm and °so this change of space is important for that.° .h ↑uhm¿ it also happens uh by accident, if you don't really understand the structure of your scene space¿ and you think you're mapping to one space¿ when in fact you're mapping to something else¿↓ and in that case we could sort of say well that's a change of space that happened. °even though it was unintentional.°

(6.0) ((takes off slide, puts onto pile and puts new slide onto OHP. title: "Task-based change"))
↑okay. so here's the sort of just a quick example of what a task based changed space uh might be like¿ uhm¿ suppose we had just a whole bunch of x y pairs¿ that we collected¿ in some sort of experiment¿ sampling¿ we can ((points)) sort of look at that as a function from some unstructured uh ennumeration space to pairs¿ but what we really want↓ is to transform that to a function of two variables x and y. and a °sort of scattergram.° so (.) the (.) well the (.) »the way ((takes slide off)) the data is collected isn't necessarily °the way ((puts onto pile)) you want to wor- use it. i suppose.°
(2.0)

I have chosen to call those parts of talk surrounded by pauses *sections*. In the above example, there are three sections. The term *boundary* will be used for that part of the seminar talk which consists of the last part of a section, the pause, and the first part of the new section. At this stage, these definitions are simply heuristic devices to aid discussion. I have purposely chosen the term 'section' rather than 'verbal paragraph' (Chafe 1979), 'paragraph' (Hinds 1979) or 'paratone' (Brown and Yule 1983b), to avoid any theoretical association with written language. As can also be seen in the above example (Example 2), the sections are marked visually. By choosing to present the data, with a space dividing larger units of talk, it is possible to give visual representation to the stream of sounds that the presenter produces. This, together with the transcription conventions, enable the analyst

to represent the spoken word to the reader. Goodwin (1994) discusses how the division of talk into lines in the transcript should clarify for the reader the way in which the speaker organizes his or her talk. However, it must be remembered that the choice of the visual impact is that of the analyst.

Ochs' (1979) notion of planned and unplanned discourse is also relevant to any discussion of seminar talk. Unplanned discourse is characterized as being discourse that lacks forethought or organisational preparation (Ochs 1979:55). The seminars in this study are neither totally unplanned (e.g. conversation) nor totally planned (e.g. a read seminar). This is because discourse can be planned at a number of levels. In seminars, the macrostructure of the talk is generally planned in advance, as evidenced by forethought and creation of overhead slides. In this sense, the seminar is an organized piece of talk. However, the seminar is unplanned in respect of the actual encoding of ideas and thoughts into langauge. In all the seminars in this study, presenters 'talk to the overhead', resulting in spontaneous, unplanned discourse. As a result, these seminars display features of unplanned discourse, in terms of its structural organisation and its frequent use of repair. However, seminars differ from other unplanned discourse, such as ordinary conversation. In conversation, the speaker has to attend to the demands of a finely tuned turn-taking system. In seminars, this turn-taking system is suspended, resulting in a more predictable, sequential ordering of talk. As a result, the speaker can concentrate on the conceptual demands of attending to the propositions he/she wishes to express in the form he/she wishes them to be expressed.

This distinction between the seminar as planned or unplanned discourse has also been discussed (using different terminology) by Dudley-Evans and Johns (1981) who classify three styles of lectures: reading style, conversational style, and rhetorical style. In the reading style the speaker reads the talk from prepared notes. Such talk is characterized by short tone units and narrowness of intonational range. In the conversational style the speaker speaks informally, with longer tone units and a more varied intonational range. Rhetorical style refers to presenters who make the speech into an 'art form', with an even larger intonational range. The seminar talk in this thesis is of the conversational style.

In seminars, speakers indicate the structure of the monologue by the combined use of a number of linguistic cues, including, syntactic, semantic and phonological, as well as interaction with visual aids. The way in which the cues combine to work together to indicate the overall structure of a talk is based on the shared assumptions that speaker and audience have about how language, and in particular conversation, works. 'Shared assumptions about how tone groupings, accent placement and tune interact with grammar and lexicon to suggest relationships are thus a precondition for shared interpretation and for the maintainance of conversational involvement' (Gumperz, 1982:118).

1.5 Discourse Markers

Lexical items such as *oh, well, so, okay, now, I mean, y'know* have been variously termed and variously defined. Terms include discourse markers (Schiffrin 1987, Fraser 1990, Jucker 1993) bracketing markers (Goffman 1974), boundary exchanges (Sinclair and Coulthard 1975), conjunctives (Halliday and Hasan 1976), discourse particles (Schourup 1985), micromarkers (Chaudron and Richards 1986; Flowerdew and Tauroza 1995) and interclausal connectives (Segel, Duchan and Scott 1991). The terminology and definition used in this thesis will basically follow that of Schiffrin (1987) who defines discourse markers as being 'sequentially dependent elements which bracket units of talk' where units of talk can be sentences, propositions, speech acts or tone units (Schiffrin 1987:31). 'Sequentially dependent' refers to the fact that the units of talk immediately prior and subsequent to the discourse marker determine the type of marker to be used. More importantly, discourse markers are multifunctional, they are never obligatory, and are syntactically diverse (Schiffrin, 1987:64). It is important to add that discourse markers do not affect the propositional content of an utterance (Hölker 1991, discussed in Jucker 1993). They are seen as external to the utterance (Schiffrin 1987: 328) and as such do not affect the truth or falsity of the utterance.

In terms of delineating which lexical items should be considered as discourse markers, there is general acceptance of a core group of discourse markers: *oh, well, so, okay, now, I mean, y'know*, although, outside this core group wide variation exists. For example, Schiffrin (1987) includes items such as *and, because, then* on her list of discourse markers, yet she does not include *okay*. Chaudron and Richards (1986) include an even wider set of temporal, causal, contrast, emphasis and segmentation markers. Fraser (1990), on the other hand, has a large list of ninety-two 'representative' discourse markers, used in both spoken and written discourse, yet specifically excludes *oh, y'know* and *I mean. Okay* is included in the list. It will be seen that of the three most frequently occurring markers used by presenters in this study (*okay, so, uhm*), only *okay* and *so* would appear to belong to the core group. An important part of the analysis (Chapter 4) will be to argue that *uhm* is in fact a discourse marker, in that it fits the definition and characteristics of what it means to be a discourse marker.

Many of the discussions of discourse markers (Flowerdew and Tauroza 1995, Jucker 1993, Segel, Duchan and Scott 1991, Fraser 1990, Schiffrin 1987, Chaudron and Richards 1986) have revolved around the issue of their role and function within discourse. Chaudron and Richards (1986) maintain that discourse markers (called micro-markers) fulfil no semantic role within the discourse. They argue that it is the surrounding discourse that determines meaning, with discourse markers simply indicating problems of on-line

discourse production. In spoken text they act as filled pauses, giving the speaker time to organize his or her thoughts and the listener time to process the spoken signal. In this way they resemble punctuation at the beginning and end of tone units. If they were deleted from the text, the text might be more difficult to understand due to information overload, but meaning would not be sacrificed.

Schiffrin (1987), however, holds that discourse markers have both semantic and pragmatic meaning. The discourse marker *so*, for example, has the semantic meaning of showing result, yet it also has the pragmatic meaning of marking potential speaker transition. In its semantic sense, *so* can mark structure at two levels (Schiffrin 1987:194). It can mark structure globally by referring to the overall structure of the discourse. In this sense the discourse marker has a wide scope marking structure at a higher level. Alternatively, it can mark structure locally, by referring to the previous tone unit. Such a discourse marker has a narrow scope and is marking lower levels of structure. Discourse markers also function pragmatically, although still retaining a connection with their semantic function (Schiffrin 1987:313). This connection influences the overall pragmatic meaning of the discourse marker and restricts the environment in which particular discourse markers can occur.

The role played by discourse markers in maintaining cohesion within the discourse is also important. Schiffrin (1987:321) sees discourse markers as displaying structural relations between utterances, although not creating such relations. Cohesion is maintained either at a local level, between successive clauses, or at a global level, over units of discourse. Halliday and Hasan (1976) also see discourse markers (called conjunctives) serving as local discourse cohesion devices. Conjunctives can be additive, adversative, causal and temporal and are used to signal the relationship between a given clause and the preceeding clause. Brown and Yule (1983b:106) discuss the role played by discourse markers in aiding interpretation of the discourse. Failure to use discourse markers may make interpretation more difficult, but not necessarily result in failure to communicate.

Segel, Duchan and Scott (1991:151) see discourse markers (called interclausal connectives) as shaping the interpretation of the clause they precede and guiding its integration into the story. In this sense, discourse markers are not empty or redundant to the information provided by the propositions in the text, rather they assist the listener in interpreting the text according to a particular frame of reference or mental model. They tell the listener whether the coming text is continuous or discontinuous with the current text. Like Schiffrin (1987), Segel, Duchan and Scott (1991) see discourse markers as carrying meaning and functioning at both local and global levels. Their model, however, does not deal with the pragmatic role of discourse markers discussed by Schiffrin (1987).

Discussions have also focussed on the meanings of individual discourse markers. Because of their polyfunctionality, attempts have been made to try to find a core meaning to which all instances of discourse markers can fit. The obvious problem with trying to find a core-meaning is over-generalisation, in that any descriptive precision is lost. Jucker (1993), for example, uses relevance theory as a descriptive framework in order to describe the core meaning of the discourse marker, *well*. Fraser (1990:394) holds that discourse markers have a core meaning, although it is not necessarily related to their syntactic meaning. He sees discourse markers as belonging to a class of a class of pragmatic markers. In this regard he differs from Schiffrin (1987) who sees discourse markers in their pragmatic function as being pressed into extra duty service and thus retaining their syntactic meaning.

Discussions of specific individual discourse markers have mainly concentrated on how they function in conversation (Schiffrin 1987, Jucker 1993), in opening a telephone conversation (Schegloff 1979a, 1986), and in closings (Schegloff and Sacks 1973, Button 1987, 1990). Discourse markers also occur in institutional talk, such as, classroom discourse (Sinclair and Coulthard 1975, Burton 1981, Coulthard and Montgomery 1981), service encounters (Merritt 1984), family decision makings (Condon 1986), meetings (Beach 1990) and interpreting children's stories (Segel, Duchan and Scott 1991). The function of discourse markers in monologues, such as seminars, has not been looked at in detail. Goffman (1981) simply mentions how footing is communicated through cues and markers in speech, and Flowerdew and Tauroza (1995) have carried out research on the effect of discourse markers on second language lecture comprehension. However no detailed analysis, using conversation analysis techniques, of discourse markers in seminar talk has been carried out.

1.6 Application to English for Academic Purposes

The task of applied linguistics is to 'look for models of language description which relate to the experience of the learner as user' (Widdowson 1984:5). Analysis of the role and function of discourse markers in seminar talk provides tertiary level English as a Second Language (ESL) students with important information as to how native speakers use less formal, 'everyday' language to communicate the structure of the extended monologue in the academic setting. Such information has important applications for English for Academic Purposes (EAP), both in terms of academic listening, and in terms of academic speaking for ESL postgraduate students who are required to present their work publicly in the form of seminars, lectures and conference papers.

Traditional advice places emphasis on making the second language student aware of the importance of signposting (Lynch and Anderson 1992, Garbutt and O'Sullivan 1991, Smith *et al* 1986, McEvedy *et al* 1986, Ballard and Clanchy 1984, Lindsay 1984, Brown and Yule 1983a, Lynch 1983, Wallace 1980). Examples of signposting generally consist of lists of useful phrases, such as: *I'd like now to move onto.....* However, the present research suggests that such advice, although useful, ignores what native speakers are actually saying and doing in order to structure and manage their presentations.

Although there has been little attempt to instruct the second language student in the role and function of discourse markers (sometimes called micro-markers in the ESL context) as apposed to signposting phrases (sometimes called macro-markers in the ESL context), a few applied linguistics studies have looked at the effectiveness of discourse markers in the comprehension of lectures by second language students (Chaudron and Richards 1986, Hansen 1994, Young 1994, Flowerdew and Tauroza 1995). The findings, however, are contradictory.

An early study by Chaudron and Richards (1986) tests whether the addition of macro- and micro-markers to a lecture (without any markers) has a positive effect on recall for ESL students. The results show that the addition of macro-markers makes a lecture more likely to be understood, whereas, an over-use of micro-markers possibly detracts from the overall coherence of the lecture (Chaudron and Richards 1986:124). Chaudron and Richards therefore encourage writers of EAP courses to place emphasis on macro-markers, and to avoid the use of micro-markers (discourse markers). Such results seem initially surprising, in that they contradict findings of research into narratives in which discourse markers shape the interpretation of the story (Segel, Duchan and Scott 1991). In addition, work by Tyler and Bro (1992) suggests that native speakers seem to understand non-native speakers (NNS) better, in terms of comprehension and coherence, when discourse markers are used. However, Chaudron and Richard's methodology has problems, in that they took a lecture and added macro-markers and micro-markers (discourse markers) to it. The problem is that the initial lecture to which the markers were added was in the reading style. In other words, it was a written-out lecture. As a result, the final product was not a natually occurring piece of discourse. In fact, the way in which the discourse markers were added, as shown by the examples given in the article, do not even seem to accord with how discourse markers are used in ordinary conversation. They are clearly added on. It is therefore not surprising that the results show that discourse markers detract from overall coherence of the lecture.

A later study (Flowerdew and Tauroza 1995) demonstrates the opposite result. In their study, they compared ESL students' comprehension of a video of a naturally occurring lecture with a video of the same lecture, yet with the discourse markers (*so, right, well, okay, now*) deleted. The results show that students understood the lecture better when the discourse markers were present than when they were deleted. Such findings agree with Dorr-Bremme (1990) who shows that when discourse markers are absent from teacher talk, kindergarten children interpret the situation as being due to the teacher having no special agenda. As a result, classroom interaction breaks down. When discourse markers are present, the children have a clear understanding of there being a specific, teacher-controlled agenda.

Due to the close link between applied linguistics research and language teaching, in that the former provides the theoretical base for the latter, it is critical that applied linguistics research has a valid methodology. Unfortunately, based on Chaudron and Richard's findings, some EAP courses (e.g. Mendelsohn 1994, Lynch and Anderson 1992, Garbutt and O'Sullivan 1991) place emphasis on macro-markers rather than micro-markers (discourse markers). I have been unable to find any course books that discuss the role of discourse markers in lecture comprehension.

Therefore, the aim of this current research is, by using naturally occurring data, to analyse the role and function of discourse markers in seminar talk. Such research is important, not only in the area of conversation analysis and institutional talk, but in looking at how scientists combine the verbal (discourse markers) and the non-verbal (gesture, interaction with tools) to build up a picture of what is going on. Discourse markers are widely used by computer scientists in seminar talk as signposts to the audience as to the structure of the talk. However they do not work alone. In combination with intonation, pitch, volume, gesture, and interaction with tools, discourse markers are an available resourse for the presenter to assist in informing the audience of the structure of the talk. Instructing ESL students in the role and function of discourse markers, therefore, is an important task of the applied linguist.

1.7 Methodology

The data for this present research originated from Commonwealth Scientific and Industrial Research Organisation (CSIRO). A series of weekly seminar presentations organised by CSIRO's Division of Information Technology (DIT) were videoed and the first six native speaker presentations were transcribed using traditional conversation analysis methods. Conversation analysis transcription conventions are to be found at Appendix 1. The

seminars range from 40 to 80 minutes in length. The discussion phase at the end of the seminar was not transcribed. All presenters were male. All presenters projected slides onto a screen, either from an overhead projector, or directly from a computer. One presenter used a video image operated via the computer. The presenters gave permission for the seminars to be videod and analysed. Presenters were told that the researcher was interested in determining how they used their visual aids. No mention was made of the researcher's interest in how presenters structure their talks through the use of discourse markers. As DIT seminars are often videoed, the presence of a video camera is not unusual, and it is therefore assumed that presenters were not adversely affected by the presence of the camera.

It is important to note that the seminars were part of an in-house series of seminars, where either DIT staff or visitors from other CSIRO Divisions or university departments (e.g. Computer Science Department at the Australian National University) gave seminars on research-in-progress. All seminars were given in the conversational style, with presenters 'talking to the overhead'. No-one read from a text or even used written notes of any kind. They tended to use a large number of visual images, such as, overhead slides, images on the computer, videos, models, and the whiteboard. Apparently, the 'rule of thumb' for computer science seminars is to plan for about one slide every two minutes.[2]

Analysis of the six seminars indicates frequent occurrence of discourse markers, although some speakers have preference for particular discourse markers in particular environments. The frequent use of discourse markers is probably due to the fact that the presenters chose a conversational style of presentation. If presenters had chosen to read their seminars, there may have been fewer discourse markers. Due to the length limitation of this thesis, only the three most frequently occurring discourse markers (see Table 1) are analysed.

[2] Personal communication, Peter Lamb.

Presenters	Discourse Markers		
	okay	*so*	*uhm*
Mark	5.13	13.33	42.72
Mitchell	2.84	7.22	22.88
Andrew	4.63	5.75	82.58
Paul	3.08	9.55	72.11
Oswald	3.48	19.91	42.13
Roger	.18 (1 occurrence)	3.41	36.46

Table 1: *Number of times per 1000 words* okay, so *and* uhm (or uh) *are used as discourse marker by 6 presenters.*[3]

Okay, so, and *uhm* are not only the most frequent discourse markers, they are also the most interesting. Because the environment in which they most commonly occur is at the beginning of a section, they clearly play a strong structuring role within the seminar as a whole. At the beginning of a section, they either occur on their own or in combination. The most distinctive composite is *okay so.*

The following example (Example 3) demonstrates the distribution of *okay, so* and *uhm* (highlighted in bold and arrowed) in the middle of a seminar given by Mark.[4] Because *so* and *uhm* have multiple functions within seminar talk, only those clearly functioning as discourse markers have been highlighted.

Example 3
(Ma:19)

(1.5)
(1) —> **uhm¿** (1.0) ((puts new slide onto OHP. title: "General bundle model")) ↑and here maybe is a↓ (.) some algebra for a generalised uh (1.0) uh property, generalised version of that¿ uh which is really just defining a section »as i've said of pairs °which is a function model.° ((takes slide off)) °details aren't ((puts slide onto pile)) really important.°

(2.5)
(2) —> t! ↑**OKAY. SO** ((puts new slide onto OHP. title: "The change of space")) ONE THING THAT I I HAVEN'T MENTIONED YET, AND WHICH I THINK ((walks over to 2nd OHP)) IS ACTUALLY REALLY IMPORTANT¿ uh is this arrow here. (.) ((points to OHP)) which is the
(3) —> change of space. (.) ((walks back)) **uhm** (1.0) .h now what that's about, is uh as i sort of alluded to earlier¿ it's not always the case that you find your ((points to OHP)) information space here¿ we find a scene that's directly isomorphic to it and that's it as the end of your display. it's often the case that you need to start in one information space and transform uhm to a different space. in order to make sense. now here are some cases where that has to happen¿ first of all if the uh information spaces out here¿ ((points to OHP)) where the where there aren't any isomorphic scene spaces. you

[3] Only occurrences of *okay, so* and *uhm* or *uh* as discourse markers have been included in this table. *So* in its resultative sense and *uhm* or *uh* as repair device have been excluded.
[4] Pseudonyms are used to preserve annonymity.

have to find a mapping to one here¿ but often the just the task that you want to perform¿ uh »requires a different structure than the one that you started with.↓ uhm and °so this

(4) —> change of space is important for that.° .h ↑**uhm¿** it also happens uh by accident, if you don't really understand the structure of your scene space¿ and you think you're mapping to one space¿ when in fact you're mapping to something else¿↓ and in that case we could sort of say well that's a change of space that happened. °even though it was unintentional.°

(6.0) ((takes off slide, puts onto pile and puts new slide onto OHP. title: "Task-based change"))

(5) —> ↑**okay.** so here's the sort of just a quick example of what a task based changed space uh might

(6) —> be like¿ **uhm¿** suppose we had just a whole bunch of x y pairs¿ that we collected¿ in some sort of experiment¿ sampling¿ we can ((points)) sort of look at that as a function from some unstructured uh ennumeration space to pairs¿ but what we really want↓ is to transform that to a function of

(7) —> two variables x and y. and a °sort of scattergram.° **so** (.) the (.) well the (.) »the way ((takes slide off)) the data is collected isn't necessarily °the way ((puts onto pile)) you want to wor- use it. i suppose.°

(2.0)

The above example illustrates three sections. Each section is bounded by longish pauses, ranging from 1.5 seconds to 6 seconds. The first short section commences with *uhm* (arrow 1); the second long section commences with the combination, *okay so* (arrow 2); the final section again commences with *okay so* (arrow 5). At the boundary of each section,[5] the old slide is removed and the new one put on the overhead projector. This either occurs at the end of the previous section, during the pause or during the first part of the new section.

Table 1 and Example 3 illustrate the frequency and distribution of discourse markers in seminar talk. Example 3 illustrates the importance of the beginning of a section. The first word at the beginning of the new section is nearly always a discourse marker[6] (arrows 1, 2, 5), thereby orienting the audience as to the structure of the talk. The presenter also interacts with the tools at this stage (arrows 1, 2, 5). Example 3 shows how discourse markers are not limited to the beginning of a section. They can also occur at the end of a section (arrow 7), as well as within a section (arrows 3, 4, 6). In addition, Example 3 illustrates how any description of the role and function of discourse markers must account for the way in which discourse markers occur in combination at the beginning of a section (arrows 2, 5). Analyses to date have tended to ignore composite discourse markers, apart from noting that they occur (e.g. Flowerdew and Tauroza 1995, Schiffrin 1987).

The transcripts follow the conventions of Gail Jefferson (e.g. Jefferson 1989) although a few additional notations have been added for the purposes of this thesis (see Appendix 1). In order to explicate as clearly as possible what occurs at the boundary, it is sometimes necessary to add additional lines for the actions taking place (Action) and for what is

[5] For definition of a boundary, refer to page 9.

occurring on the screen (Screen).[7] In accordance with conversation analysis techniques, as much detail as possible has been included in the transcripts.

1.8 Conclusion

Analysis of the role and function of discourse markers in computer science seminar talk is important for a number of reasons. Firstly, it adds to the current research into the way in which scientific discourse functions at higher levels of organisation. In particular, by examining the way in which scientists use both verbal and non-verbal discourse, it is possible to better understand how scientists build meaning in order to aid communication. Secondly, it provides further insights into the role and function of discourse markers in both conversation and institutional talk. Just as the role of discourse markers in conversation can provide insights into how they function in seminar talk, so too can the knowledge of their role in seminar talk shed light on the functioning of discourse markers in everyday conversation. Thirdly, such analysis provides further information as to the way in which native speakers structure their seminars. This is important not only for the native speaker who wishes to better understand the way in which talk is structured, but also for the non-native speaker who is struggling to manipulate the language in order to make his/her talk understandable to the academic community.

The following chapters examine the three most commonly used discourse markers, *okay, so, uhm,* in computer science seminar talk. Detailed analysis is made of their environment, restrictions on their distribution, their function within the discourse as a whole, and how they interact with physical activity. As a result, it will be possible to see how native speakers use discourse markers to organize the grammar of their discourse, such that the structure of the seminar is demonstrated to the listening audience.

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[6] There are only one or two examples in the data where no discourse markers are used at the beginning of a section.

[7] Additional lines in the transcripts are adapted from Goodwin (1981).

Chapter 2
Okay as Discourse Marker

2.1 Introduction

Okay is the most distinctive discourse marker in seminar talk. It has a characteristic intonation pattern and distribution and most frequently occurs at the beginning of a section, either on its own or in combination with *so*. Although I have chosen to commence the analysis with *okay*, I could have chosen either of the other two discourse markers under discussion. This is because the aim of this thesis is to build up a *picture* of how presenters use the most frequently occurring discourse markers, *okay, so* and *uhm*, to structure their talks. Although the three markers can occur in a number of different environments throughout the talks, they *all* occur in the most important of positions, at the beginning of a section. Much of the analysis will therefore focus on how they function, either on their own or in combination, in this position. A section was initially given a 'working' definition, as a segment of talk surrounded by longish pauses (Chapter 1). By the end of the discussion (Chapter 5), after detailed analysis of how the individual discourse markers function, we will have a clearer picture of what a section is and how it functions within seminar talk.

Prior research into the function of *okay* indicates it is used in association with closing something off, such as prior talk or a prior activity. *Okay* can be used in sequence closing thirds to register and accept a responsive action, such as an invitation or a request (Schegloff 1995:117). *Okay* also plays a closing off role in the pre-closing environment of telephone calls, by indicating that the previous topic has been finalised and that the speaker is ready to move into the closing phase of a conversation (Schegloff and Sacks 1973, 1984, Button 1987, 1990). Although *okay* indicates the willingness of the speaker to close the conversation, it also allows the recipient the opportunity to reinstate an earlier or unexpanded topic, or to open up a different topic prior to closure of the telephone call. The call only moves into its final closing phase when a reciprocal *okay* is given by the recipient.

Okay can also be associated with initiating a new topic, such as at the beginning of a conversation following telephone openings, to mark the movement to the initial topic or business of the call (Schegloff 1979a, 1986). Similarly at the beginning of meetings, *okay* is used as a means of calling participants to order, by closing off the pre-meeting phase and moving into the business of the meeting (Beach 1990). *Okay* occurs in teaching exchanges as part of the framing move to indicate that one stage of the lesson is ended and another

about to begin (Sinclair and Coulthard 1975, Hatch 1992, Dorr-Bremme 1990). It also occurs in service encounters as a linking device between two phases of the encounter (Merritt 1984), and in family decisions as a bracketing or framing device when choosing between alternative actions (Condon 1986).

Okay therefore appears to play a double role of closing off yet at the same time indicating a readiness to move onto the next topic. This pivotal role of *okay* is also discussed in Beach (1993) who sees *okay* as being responsive both to prior talk yet at the same time being preparatory to, or in a 'state of readiness' for, subsequent talk. This double function of *okay* is particularly useful in teaching exchanges and, as we shall see, in seminar talk, because it provides an effective and efficient method of connecting prior and subsequent talk. One simple lexical item, *okay*, is able to link what has gone before with what is about to come.

Table 1 indicates the total number of occurrences in the data of *okay*, plus a breakdown of the environments in which *okay* occurs for the six different speakers.[1]

Presenters	*Okay* in Different Environments			
	okay **(total)**	***okay*** **at beginning of a section**	***okay*** **associated with end of a section**	***okay*** **in the middle of a section**
Mark	48	32	6	10
Mitchell	33	23	3	7
Andrew	22	17	5	0
Paul	27	20	1	6
Oswald	18	17	1	0
Roger	1	1	0	0

Table 1: *Number of times* okay *is used in different environments for 6 presenters*

Okay most frequently occurs at the beginning of a section. Less frequently, *okay* is associated with the end of a section, or it occurs with rising intonation within a section. Not all speakers, however, use the discourse marker *okay* in their seminar presentations. Roger, for example, only has one instance of *okay* within his talk. Subsequent analysis (Chapter 4) will show how he prefers to mark the beginning of a section with *uhm*.

[1] The emphasis in this thesis has been to find patterns of behaviour of the different discourse markers in order to determine their particular functions within the different environments. I have therefore chosen to present the actual number of occurrences of the different discourse markers in tabular form in order to give an indication of the sort of numbers that we are dealing with.

Table 2 gives a breakdown of *okay* at the beginning of a section into *okay* occurring as part of a composite, and *okay* occurring alone.

Presenters	*Okay* at Beginning of a Section		
	okay (total)	composite *okay* e.g. *okay so*	*okay* alone
Mark	32	27	5
Mitchell	23	15	8
Andrew	17	15	2
Paul	20	13	7
Oswald	17	10	7
Roger	1	0	1

Table 2: *Number of times* okay *is used in combination and alone at the beginning of a section for 6 presenters*

At the beginning of a section, *okay* most frequently occurs as a composite marker, with the most common composite being *okay so*. Composites are therefore important in seminar talk and deserve specific attention. The 'problem' for the analyst is whether composites are functioning as a single unit, that is, as a single compound discourse marker, or whether different discourse markers simply co-occur in the same environment, yet maintain their individual functions. The solution to this problem lies in initially analysing the individual discourse markers, followed by an examination of their functions when they co-occur.

As a result, this chapter will only analyse *okay* as it occurs on its own at the boundary, and within a section. Two variants of *okay*, *alright* and *right*, will also be examined. This will enable the most important composite, *okay so,* to be analysed in Chapter 3, following the discussion of the discourse marker, *so*. A number of composites involving *okay, uhm* and *so* will be discussed in Chapter 4.

2.2 *Okay* at the boundary

In keeping with the previous discussions of *okay* (Schegloff 1995, Button 1990, 1987, Schegloff and Sacks 1973), *okay* in seminar talk marks the end of something, enabling something else to happen. This is most apparent when *okay* follows a Q-A exchange (Example 1[2]).

[2] Examples tend to be long in order to give as full a picture as possible of what is occurring. Arrows mark segments of talk that are discussed in subsequent text. Relevant discourse markers are highlighted in bold. I tend to illustrate each point with more than one example, although in conversation analysis, one

Example 1
[Ma: 5]

(5.5) ((takes off slide and pus onto pile))
(1) —› Pres: kh:: ↑OKAY. ((picks up new slide)) but I'D LIKE TO TALK MORE ((puts new slide on OHP. title: "conceptual level")) ABOUT THE UHM (2.5) THE CONCEPTUAL level of information display. and that's really trying to look at what's happening here, ((walks over to 2nd OHP)) uhm but from the users point of view.↓ ((ponts to diagram on 2nd OHP)) from the point of view of the of the human viewer. so ((walks back to 1st OHP)) we define uhm¿ (.) t! information spaces which are sort of analogous to data spaces, except that it's the information, as percieved and understood by the person viewing the display, and using it for their task¿ (.) uhm¿ t! and scene spaces, ((points to OHP)) which is like device output, but as interpreted by the human viewer. and that
(2) —› scene structure uh is often quite different (2.0) ((takes off slide)) to what we call the
(3) —› °device structure. ((looks up at audience)) yeah.° ((puts slide onto pile))
(4) —› Aud: quickly. the conceptual model is just for the user of the system¿ not for the designer of the system¿
(2.0)
Pres: uh (.) alright. i'm sort of using the user maybe to mean human. uhm it's uh the (.) yeh. it's the level as seen by the by- I MEAN IT REALLY IS (.) according to the user of the system. uhm ↓because they're the ones that uh are looking for the information.
(5) —› an' °are looking for the scene structures.°
(1.5)
(6) —› Pres: °°**oka [y.**°° [(1.8) [.h so uh just as an example of (.)=
Action: [touches slide [picks slide up [puts new slide on OHP. title: "image scene"

Pres: =maybe how a ay a scene, as perceived, differs from the scene as <the scene as a person sees it differs from the scene as the computer sees it> maybe¿ uhm¿ if this is the output ((points to OHP)) of your imaging system. well then (.) it sort of thinks it's a a 2-d or a r-g-b values.....

In this example, the presenter commences a new section, in louder, raised pitch talk, following a 5.5 second pause (arrow 1). Such prominent talk is typical of the beginning of a section, with the exchange of slides also occurring at this point. He then finishes the section with quieter talk, accompanied by the removal of the old slide (arrow 2, 3).

The notion of a section, with prominent talk at the beginning and less prominent talk at the end, accords with Brown and Yule's (1983b:100) discussion of paratones. At the beginning of the section, speakers generally make their voice phonologically more prominent by saying the first few clauses with raised pitch and/or more loudly than surrounding talk. At the end of a section, the final comment is said with falling intonation and less prominent talk. Reduced prominence is generally achieved by lower pitch and/or reduced volume. Similar contrasts in pitch and volume are evident in conversation, for example, in topic closing sequences. Successive turns of the topic-closing sequence tend to be produced with declining volume and pitch, whereas the new topic or sequence is

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instance of a particular feature is considered to be sufficient evidence. By giving more than one example, it enables the reader to more easily generate a picture of the function of discourse markers in seminar talk. This is important for understanding the way in which they function as composite discourse markers.

produced with sharply increased volume and pitch (Schegloff 1995:191).

Although the term *section* was introduced in Chapter 1 as a heuristic device, it should already be apparent that dividing a seminar into sections is not simply done at the whim of the analyst. Sections have a clear beginning, middle and end, and subsequent analysis will demonstrate the way in which discourse markers combine with other cues to let the audience know where a section starts and where it ends.

In Example 1, before the presenter can pause and move onto the next section, he is interrupted by a member of the audience (arrow 4). He answers the question, finishing the answer with lower pitch and quieter talk (arrow 5). Use of declining volume and pitch is a feature of topic-closing sequences in conversation (Schegloff 1995:191) and resembles the reduced phonological prominence characteristic of the end of a section. He then pauses for 1.5 seconds and says a quiet *okay* with falling intonation (arrow 6). As can be seen from the double action line in the transcript, the presenter touches the new slide during the last part of the *okay*, but does not pick it up. He picks the new slide up during a 1.8 second pause and puts it on the overhead projector as the new section commences with the presenter breathing in and saying *so uh just as an example of.....* more loudly than the previous talk.

In this example, *okay* is closing off the Q-A exchange, resembling the way in which *oh* or *okay* close a sequence-closing sequence in conversation (Schegloff 1995:187). The closing off occurs *after* the 1.5 second pause, indicating that the Q-A exchange is only closed down after the presenter has allowed the audience a chance to ask further questions. Whenever *okay* is used in this way in seminar talk, it occurs with falling intonation. The falling intonation indicates that *okay* is closing off a particular idea or action. Subsequent talk, following a pause, is said more loudly than the quieter *okay*. Therefore *okay* both closes off the Q-A routine and enables the talk to continue, by returning the talk to seminar talk. To facilitate discussion, this type of *okay* will be called $okay_1$. *Okays* of this type are less common and tend to be associated with closing off an answer to a question or a video segment.

The following example further illustrates $okay_1$ following a Q-A sequence (Example 2).

Example 2
[Ph:10]

Pres:	... as soon as we put in the code that allowed people to weave in and out of traffic¿ as you may or may not have noticed¿ <people do in oxford street¿> uhm¿ the the simulation actually uh flowed freely. »uhm¿ it was it was really startling to see the difference.=
Aud1:	=are you saying that if drivers can weave in and out of traffic,
	([ ]=

Pres: [yes.]
=yes. uh this is uhm this is avoiding avoiding stopping.
Aud1: mhm.=
Pres: =so if you if you see a car in front of you that's stopped¿ and you have a free lane beside you¿ and you can use that lane¿=
Aud1: =°you should.°=
Pres: =you should. hh
Aud2: is that because people stop, to turn right?
Pres: u:h a lot of the time yes. yes. (.) or or sometimes a right hand lane, a right hand tane, >right hand turn lanes< that fill up, and spill out into into the th through traffic. a stopped car, ((cough)) is uhm¿ really messes up the the <the flow of traffic.> so <°the less stopped cars the better.°>

→ Pres: [(1.0) [(2.0) [°°**oka:y.**°° (0.8) [(2.0)=
Action: [nods head [looks at screen [clicks on mouse [looks at screen
Screen: [new image appears

Pres: =.h uhm¿ (0.8) we've ((vaguely points)) also been working on close (renegotiation) of of uhm the scats, uhm (.) system¿ uhm¿ part of the uhm the intellegence that's in the scats box, that's sitting down in sydney¿ is is what's called the the local controller. .....

The presenter finishes the final answer with faster, quieter talk, followed by a 3 second pause during which he nods his head and looks at the screen (arrow). The presenter then pauses and says a very quiet, elongated *okay* as he clicks on the mouse. The new image appears on the screen and he looks at it for 2.0 seconds. The new section begins when he breathes in and says *uhm¿ we've also been working on.....* in a louder voice. As in Example 1, *okay* is said following the pause, indicating that the previous segment of talk is only closed off after the audience has the chance to ask further questions.

Okay$_1$ can also be used to close off a section within a section (Example 3).

Example 3
[Ma:13]

(4.5) ((taking slide off and putting on pile))
khh:: ↑OKAY. ((picks up new slide)) SO (1.5) ((puts new slide on OHP. title: 'Orders")) HE:::RE IS AN EXAMPLE¿ (3.0) t! uh we were talking about (.) .h uh orders before, as being one of the sort of structures that we're interested in¿ (0.8) uhm¿ t! and here's ((points to OHP and continues to do so while talking)) some some alge-alegnon theories,↓ uh to describe (1.0) uh orders. now. (.) °°ugh°° ((gutteral sound)) ↑the STRUCTURE OF A THEORY¿↓ is that it has it's name up the top¿ uhm¿ the signature here¿ ((points)) after the keyword introduces¿ and then its assertions. here¿ ((points)) where you can see¿
(1.0) ((remains at screen))

↑okay. so this theory says, (.) it's introducing one sort called s¿ and one operator¿↓ which is going to be used for less than or equal to¿ (1.0) uh and this is it's domain s-s¿ and this is its range b¿ well where did b come from¿ ↓that's actually a sort that's imported from this other theory, ((moves backwards to left)) .h uh <<°logic which is sort of a theory of first order logic.°>>↑ ((returns to screen))

→ (1.5) °°**okay.**°°

(1.0)
and ↑so down here, in the assertions, we've got two types of assertions. in this theory¿ this one's an equation¿ and it tells you something about↓ how that less than or equal to operator has to work¿ and this one is a claim that, <well this one is an assertion,> that this theory must satisfy

some other theory called partial order. this is a theory for total ordering¿ and must satisfy partial ordering¿ well here's the other theory (1.0) uhm (1.0) for partial ordering, uh it's also got the same uh signature¿ and it says it has to satisfy a few more things. t! uhm (1.5) t! and °<here's an example ((points to bottom of OHP)) of one of them.>°

In this example, Mark is discussing an example on the overhead. While discussing the example, he needs to give a description of the theory (indented paragraph) which he does by marking the beginning of the description with raised pitch and with the composite discourse marker *okay so*, normally used at the beginning of a section. The description is finished with faster, lower pitch, softer talk and closed off with *okay,* said with falling intonation and with reduced volume (arrow). The presenter then pauses for 1 second and reverts to his discussion of the example.

Okay$_1$ contrasts with a different, more prominent *okay* that can also occur at the boundary. Whereas *okay*$_1$ is associated with the end of a section, in that it is said more quietly than subsequent talk, *okay*$_2$ is clearly associated with the beginning of a section (Example 4).

Example 4
[Ph:1]

Pres: .....uhm¿ (1.0) so and and i haven't had a chance to uhm run through the final, hh ((laugh)) run through. .hh because i've spent all morning trying to get this box to work. so my apologies if it sounds a little
—> Pres: bit °uhm¿ [a little bit haywire.° (2.0) [↑**oka** [**:y.** what i'm going=
Action: [moves mouse to pad [clicks on mouse
Screen: [new image on screen

Pres: =to be talking about today¿ is the uh the tritram project. and this is basically just an update of uh research. u:hm¿ what we've been doing uh recently¿ uhm¿ what the system currently does¿ and u:h where it's uhm headed in the future.↓ uhm¿ <a little bit of> uh uhm background on the the project¿ .....

We saw above how the beginning of a section is characterised by raised pitch and louder talk. It is clear therefore, that *okay* in this example (arrow) is quite different from *okay*$_1$ in that this *okay* is associated with the beginning of the section. The previous section is closed, as indicated by falling intonation and quieter talk, during which, as the action line shows, he moves the mouse to the mouse pad. This is followed by a 2.0 second pause and the new section commences with raised pitch, *oka:y. what i'm going to be talking about today¿* He clicks on the mouse at the same time, resulting in the new image on the screen. Although *okay* is still said with falling intonation, subsequent talk follows immediately, with no pause being evident.

Okays which occur at the beginning of a section (Example 4) are quite different from the first type of *okays* (Examples 1-3), in that they are more clearly playing a double role.

Although *okay*$_1$ has two functions, that of closing off the previous part to enable the next part to continue, the emphasis is on the first part of its function, the closing off part. In contrast, *okay*$_2$ seems to emphasize the second part of its function, resembling the way in which *okay* is used to initiate a new topic in telephone calls (Schegloff 1986, 1979a) at the beginning of meetings (Beach 1990) and in teaching exchanges (Hatch 1992, Dorr-Bremme 1990, Sinclair and Coulthard 1975). It marks closing off, as indicated by falling intonation and its position following a pause and its association with clicking on the mouse, yet it simultaneously marks topic shift as indicated by its phonologically prominent position as the first word of the new section. Following *okay*$_2$ the presenter moves straight into the new topic of the section.

Okay$_2$ is the most common type of *okay* in seminar talk, either occurring singly or as a composite with another discourse marker.[3]

Presenters	*Okay* at the Boundary		
	okay$_1$	*okay*$_2$ as composite	*okay*$_2$ alone
Mark	6	27	5
Mitchell	3	15	8
Andrew	5	15	2
Paul	1	13	7
Oswald	1	10	7
Roger	0	0	1

Table 3: *Number of times* okay$_1$ *occurs compared to* okay$_2$ *for 6 presenters*

The double role played by the *okay*$_2$ enables the presenter to close off the previous part and simultaneously indicate readiness to move onto the new topic of the following section. Its position at the boundary is always the same, it is always preceded by a pause and generally not followed by a pause.

The question arises as to what exactly it is closing off. This varies according to the situation. Most commonly, *okay* is associated with the way in which the presenter uses the tools. When the presenter uses overhead slides, there are four actions that occur at the boundary. First of all, the old slide is taken off the overhead projector and put on the pile.

[3]At this stage in the discussion, the analysis is limited to the situation where *okay* occurs alone at the boundary. As can be seen from Table 2 there are not many examples of *okay*$_2$ in this position. However, subsequent analysis of the composite *okay so* in Chapter 3, will confirm the analysis of *okay*$_2$ playing the double function of both closing off and indicating readiness to commence the new section.

The new one is then picked up and put on the overhead projector. *Okay* is associated with one of these actions, normally that of taking the slide off the projector (Example 5).

Example 5
[Ma:7]

Pres: ..... so (.) in order to get a (.) scene structure »which is isomorphic to the information structure, we do it by composing individual little pieces. uhm to make a scene which is hopefully °the same as the information.°

→ Pres: (1.5) [(1.0) [↑**OKAY.** THE:: (2.0) [sort of uh (0.5)=
Action: [takes slide off [puts together with sheet; puts on pile [picks up new slide; puts down

Pres: =the sort of opposite viewpoint¿ uh is characterised by (phil's) top down paradigm. (.) uhm::¿ (.) t! in this case the (.) the data ((points to top of OHP)) is image data¿ or spatial regulatory visual data¿ once again we have this characterisation of variables¿ .....

The above example illustrates the interaction between verbal and non-verbal discourse. The previous section is closed off as indicated by falling intonation and quieter talk, followed by a 1.5 second pause (arrow). There is a further 1 second pause during which the old slide is taken off the overhead projector. As the old slide is put together with its sheet, Mark begins the new section with louder, raised pitch talk. He says *okay* (in bold), immediately followed by an elongated *THE::* .However, the new slide is not in place, and he produces a false start. The repaired version is successfully said only after the new slide is in place.

In Example 5, *okay* is associated with taking the old slide off. This is the minimum that seems to occur, in that the old slide is never taken off after *okay* has been said. In the following example, the minimum has occurred, plus the new slide has been picked up (Example 6).

Example 6
[Ar:9]

Pres: .....bumps over their structure.° (3.5) ((starts to take slide off)) u::hm¿ (1.5) so::¿ but as you can see though it's a lot smoother around the place. °though we could

→ Pres: probably [uhm do better.° [(0.5) [(1.5) **OKAY.** HERE [WE'VE=
Action: [takes old slide off [puts slide on pile [picks up new slide [puts slide on OHP

Pres: =USED soft thresholding. (.) uhm¿ but the main difference between the two methods¿ is the fact that uhm (.) i've decreased the thresholds. uhm¿ and i've in fact probably let too much noise through¿ because you can see¿ (.) there's uhm (1.5) yeah. °it's a lot more jagged.° uhm but i also have not managed to remove °the capacity uhm under here.°

This example shows how Andrew takes the slide off during the end of the previous section. He then puts the old slide on the pile and 1.5 seconds later picks up the new slide. He starts the new section with *okay*, said in a louder voice (arrow) and falling intonation.

He puts the new slide on the projector as he says, *HERE WE'VE USED soft thresholding.* Presenters seem to vary as to exactly what action in the four part sequence is associated with actually saying *okay*, although within their own talk there is consistency. Andrew, as illustrated in Example 6, generally says *okay* as he picks up the new slide. Other presenters say *okay* as they take the old slide off. No-one seems to say *okay* as they put the new slide on the overhead projector.[4]

Interaction with the computer is a simpler activity, in that by simply clicking on the mouse a new image appears on the screen. *Okay* tends to be said after the new image appears on the screen (Example 7).

Example 7
[Ph:5]

	Pres:	..... uhm¿ it works quite well if the traffic is reasonably f-free flowing¿ or even uhm lightly congested¿ it's starts to be misbehave when you've got heavily congested uhm (.) uh system, and and <they're ((flips hands in air)) the most interesting ones to study.> so ((vaguely points)) that's why you °<wouldn't always use macro.>°
		(1.5) ((looks at screen))
		u::hm¿ (2.0) ((looks at screen)) °°yeah. ((vaguely points)) that's why
	Pres:	you'd always use micro [in [(utero).°° [(1.5)=
	Action:	[clicks on mouse [looks at screen
	Screen:	[new image appears
→	Pres:	=.h **okay.** the micro model, is actually one of the areas that we've uh actually been spending a lot of time on, uh most recently. and we've uhm developed uh a car-following algorithm. uhm¿ there's nothing new about uh using a ((points at screen)) car-following aglo-algorithm, although the one we've got is slightly different to the others¿ .....

In this example, Paul clicks on the mouse during an untidy ending. The new image appears and he spends 1.5 seconds looking at the screen. He then starts the new section by breathing in and saying *okay* with falling intonation and with louder volume than the preceding talk.

The above examples show the close interaction between verbal and non-verbal activities at the boundary. Less commonly, there is no interaction with tools of any sort, and in this case, *okay* seems to simply close off the presenters decision to stand and pause for a few seconds, possibly allowing time for questions (Example 8).

[4] We shall see in Chapter 4 that the action of putting the slide on the overhead projector is generally associated with saying *uhm.*

Example 8
[Mi:5]

..... ↑the fins (.) uhm seem to need to be at the back.↓ when it's in free flight¿ <after all the water's left it¿> they only have to be (.) at the (.) behind the centre of gravity of the rocket. but when it's been pushed by the water¿ we think that the fins have to be behind the centre of force¿ from the from the water coming out the end¿ which is why most of them you'll see, are over-hanging the nozzle by quite a bit¿ uhm¿ ((puts rocket down)) and we think that's <probably a problem with this ((points to one on demo table)) one,> where °they're not really far enough down.°

(1.5)

—→ **OKAY.** AND FINALLY <YOU NEED SOME SORT OF AN AIR COMPRESSOR.> uhm¿ you can use that hand pump if you want to, but it <rapidly ceases to be a joke.> an electric air compressor's is one form¿ again the <people from the energy research centre have excelled themselves¿ they've got a scuba tank. blown up to about 2,000 p-s-i. an' hh they just let the air in through an air regulator> °thank heavens.° uhm¿ that's that's terrific. °uhm <but you have to be able to get a scuba tank.>° it turns out that the guy who works there who's interested, his brother-in-law owns a scuba shop. °so ((flaps hand into air)) that's the connection there.°

In this example Mitchell is describing the rocket by using models on a demonstration table, rather than by using an image on the screen. However, his use of *okay* at the beginning of the section (arrow), accords with how *okay* functions in this position, although in this case it only appears to be closing off the pause.

The data therefore indicates that *okay* can function in two different ways at the boundary. Either it is associated with the end of a section ($okay_1$), said with less prominence than surrounding talk and followed by a pause, or more commonly, it is associated with the beginning of a section ($okay_2$), said with more prominence and preceded by a pause, but not followed by a pause. In both cases it plays the double role of closing off to enable the next part to continue, although the emphasis is different. $Okay_1$ places emphasis on the closing off aspect in contrast to $okay_2$ which emphasizes topic shift.

There are two examples in the data of where both types of *okay* occur in close proximity. Example 9 occurs following a Q-A exchange.

Example 9
[Mi:29]

Aud2: the revolutionary new step in rocket design that you want to take, is actually to set fire to the propellor. ((laughter)) calculate the temperature at which the water you know ( ).

Pres: well there have been s s suggestions, instead of blowing it up with uhm with compressed gas, we actually again use acetyloxygen trick, and we set fire to that mixture, inside the bottle, as a source of pressure¿ hh

Aud3: but I find these sort of things sort of deviate from the point.
((laughter)) [the [idea is uh (water, air, [ )

(1) —→ Pres: [°**okay.**°
Action: [clicks on mouse
Screen: [new image

(3.0) ((more laughter))

(2) —› Pres: ↑**okay.** the other thing you can do with the model,↓ <i've got to hurry along, because i'm already over time,> uhm¿ is the effect of drag¿ ↑drag is terribly important. uhm¿ and you need to,↓ even just by ((picks up bottle)) observation. this sort of bottle, is not as good as a bottle that's got some sort of uhm (.) str (.) aerodynamic streamlining on the front. ((puts back))

In this example, Mitchell closes off the Q-A exchange, which has generated laughter amongst the audience, by clicking on the mouse to create a new image on the screen and by saying *okay*, in a quieter voice (arrow 1). This is followed by a 3.0 second pause during which there is more laughter. It is only when the presenter, and the audience, is ready to move onto the new section that he says *okay. the other thing you can do with the model,* (arrow 2) with raised pitch. The first *okay* is an $okay_1$, closing off the Q-A routine and enabling further talk to continue. We saw earlier that this type of *okay* is predominantly used in this context. The second *okay* is an $okay_2$, associated with the beginning of the new section, playing the double role of finally closing off the laughter associated with the interruption and indicating readiness to move onto the new section.

The other example illustrates a different situation, with two types of *okay* occuring at the end of the introduction (Example 10).

Example 10
[Ar:2]

Pres: ..... and i'll finally leave the introduction with an example¿ UHM¿ the f-b-i had fingerprint files¿ uh which uhm they wanted to store¿ when they first started doing things¿ uhm they got 5 to 1 °compression ratio¿ but the wavelet method was by far superior.°

(1) —> Pres: [(4.5) [°**oka::y.**° (1.5) [uhm¿ (1.5) (°period°) [(2.0)=
Action: [takes slide off; puts on pile [picks up new slide [puts slide on OHP [adjusts slide

(2) —› Pres: =**OKAY**. THE ONE method that pretty much everyone starts out with¿ uhm¿ with the wavelets, is the highway version. UHM¿ THE BASIC IDEA is you've got the sequence¿.....

Here Andrew finishes his introduction with quieter talk. He than pauses 4.5 seconds during which he takes the old slide off and puts it on the pile (arrow 1). He then says a quiet elongated *okay* with falling intonation (bold) while he picks up the new slide. He pauses for 1.5 seconds and says *uhm* as he picks up the new slide, followed by another 1.5 second pause and an unintelligable word. He pauses for a further 2.0 seconds and starts the section in a louder voice with *OKAY. THE ONE method that pretty much everyone starts out with¿* (arrow 2). In this example, $okay_1$ is closing off the introduction, enabling the main body of the talk to begin. $Okay_2$ is playing the double role of closing off the pause, or possibly the false start, and indicating topic shift.

Okay is not generally repeated. In Example 9 and 10 we saw that when it is repeated, the function of the two *okays* is different. It is not necessary to close things off twice. Example 9 and 10 support the analysis of *okay* having a double function, and that the emphasis can either be on the closing off aspect or on the topic shift aspect. For the first type, the emphasis is on the closing off aspect, either of a Q-A sequence (Example 9) or the introduction (Example 10). For $okay_2$ however, the emphasis is on the signalling topic shift aspect. There are a number of further reasons for postulating the two types of *okay*. $Okay_1$ is always said more quietly than $okay_2$. $Okay_1$ is always preceded by a pause whereas the $okay_2$ always follows a pause. $Okay_1$ follows the end of the section whereas the $okay_2$ is always the first word of the new section. In this position, it is seldom followed by a pause. Finally, the sequencing of the two *okays* confirms the functions they play, with the quieter $okay_1$ preceding the louder $okay_2$.The emphasis on closing off precedes the readiness to commence the following section.

Seminars are structured talk and one of the tasks of the presenter is to indicate the structure of the talk to the listening audience. Discourse markers are useful structuring devices and can occur throughout seminars to indicate how the following talk should be interpreted. They most commonly occur at the boundary to close off the previous section and to mark the beginning of the new section. The role of $okay_2$ is to close off what has gone before and to indicate topic shift. By so doing it clearly marks the beginning of a new section. It is also integrated with whatever tools the presenter is using. It is either associated with clicking on the mouse to create a new image on the screen or taking the old slide off the overhead projector. Sometimes more than the minimum occurs and *okay* is said following the old slide being put on the pile or the new slide being put on the screen. The important thing is that the old slide has been taken off the projector by the time *okay* is said.

Although not every presenter uses *okay*, for example Roger only uses *okay* once, the analysis shows that *if* presenters do use *okay*, they use it in the described way. Using *okay* at the boundary is one way of indicating the structure of the talk to the listening audience. It reflects the way in which *okay* is used in conversation and in institutional talk, where *okay* works simultaneously to close off previous talk or actions and to indicate readiness to move on to the next part. In keeping with this double function, *okay* may occur at the beginning of the seminar, closing off pre-seminar talk and indicating readiness to start the seminar, but not at the end of the seminar.

In seminar talk, *okay* often occurs in combination with other discourse markers at the beginning of a section and the task of the present analysis is to tease out the separate functions of the different discourse markers in this position. So far we have only analysed

okay when it occurs alone in this position, however, the subsequent analysis will further discuss the role of *okay* when it occurs in combination with *so* (Chapter 3) and *uhm* (Chapter 4).

2.3 *Okay* in middle of a section

Although *okay* most commonly occurs at the boundary, closing off the previous part and indicating readiness to begin the next, it is not limited to that position (see Table 1). *Okay* can occur within a section, where it is often said with rising intonation, as a means of checking with the audience that they understand the preceding idea (Example 11)

Example 11
[Mi:16]

(3.0) °woops°
(2.0) ((new image))
↑ALRIGHT. SO THAT'S HOW WE CALCULATE THE DRAG. now newton's second law says that uhm the time rate change of velocity, or acceleration¿ is the force¿ applied¿ divided by the mass of the object being accelerated. in our case (.) the force being applied is the reaction
(1) —› force¿ minus the drag force¿ minus the gravity force.↓ (2.0) °**okay?**° so i can substitute in there ((points to computer screen)) for that¿ (.) ↑and also the time rate change of displacement¿ (.) is simply the velocity.↓ °so d s d t equals v.° and <now i've got all the equation's i need to actually predict what actually happens¿>
(3.0)
(2) —› °yes? everyone's nodding?°

(4.0) ((new image))
↑OKAY. SO WHAT I'VE DONE is, i've simply plotted a few↓ uhm systems here, ((walks over to screen)) again ↓i apologize for the the quality of the graph.↑ this ((points to screen)) one here is what happens with a-(.) this is only the phase of the rocket flight where there's when the water's coming out the end.....

In this example, *okay* plays a checking role, making sure that everyone understands how Newton's Second Law applies in this case. Mitchell gives the explanation, pauses 2 seconds (arrow 1), says a rising intonation, quiet *okay*, before moving straight on to *so i can substitute in there.* At the end of the section, he questions the audience again as to whether they are following the mathematics of the argument (arrow 2).

A further example illustrates how the presenter uses *okay* with rising intonation in the middle of a section (Example 12).

Example 12
[Ma:5]

(0.5)
.h so ((puts new slide on OHP. title: "image scene")) uh just as an example of (.) maybe how a ay a scene, as perceived, differs from the scene as <the scene as a person sees it differs from the scene as the computer sees it> maybe¿ uhm¿ if this is the output ((points to OHP)) of your
—→ imaging system. well then (.) it sort of thinks it's a a 2-d or a r-g-b values. **okay?** but as the person sees it, uhm .h first of a::ll (.) °uh° people don't see colour in r-g-b¿ they sort of mainly see it in <hues, saturation and lightness>¿ and they don't really see the lightness in this case, they're seeing effects¿ ((points to OHP)) that make it look like shading¿ and the geometry,
( ) to make it actually look like two coloured surfaces. rather than uh an array of of r-g-b (pixels). so: the user sees the structure, which is two (.) two ((points to OHP)) surfaces. (main) »and that's obviously ((takes off slide)) °<different from the display ((puts slide onto pile)) structure.>°
(1.5)

In this example Mark is discussing the difference between how the computer perceives a scene and how a person perceives it. Following his description of how the computer sees in two dimensions or with rgb values, he says *okay* with rising intonation (arrow) to check with the audience that the previous concept is understood.

Okay can also be used, less frequently, within a section at the end of a definition (Example 13).

Example 13
[Ma:2]

(5.0) ((taking off slide, putting onto pile and putting new slide on OHP. title: "terminology"))
.h ↑SO SOME OF THE:: (1.0) uh TERMINOLOGY (1.0) that .h i'm going to be relying heavily o:n¿ (.) uh for this talk¿ first of all, uh the notion of a space, uhm¿ which you can really just think of as a set¿ <so it's all just back down to set theory.> but a space is a set. which i'm using to mean a set with some interesting structure to it. ↓ <°which we don't really know what that structure is at the moment.°> °but it can depend on the space of course¿°↑ .h uhm¿ and so being a ↑set¿ uh it has elements¿ ((points to OHP)) uh in it¿ i'm using this made-up word metaspace, to talk about uh spaces↓ which (.) whose elements are spaces. ↑so over on this model here¿ ((moves over to 2nd OHP and points to diagram)) i've got this rather fancily called
(1)—→ universal information metaspace¿ well that's a big space. and it's elements are spaces.↓ and then the °elements of those spaces are are just uh elements.°
(2.0) ((moves back to 1st OHP))
(2) —→ **okay.** an' by universal metaspace, i mean the set of all ((opens arms wide)) possible things.
(3) —→ °in that space. **okay.**° ((adjusts slide)) ↑.h there's also a notion of subspaces¿↓ <which is really just the same as> a subset¿ of that space¿ uh¿ and mappings. from °one space to another.°

(5.0) ((takes slide off and puts onto pile))
↑so some of the you will have noticed that (.) ((moves over to 2nd OHP)) this model uh (.) has two levels¿ a conceptual level up the top here¿ ((points to diagram)) and a computational level uh down the bottom¿ ((points to lower part of the diagram)).....

Mark is describing some of the terminology he will be using in the talk. He moves to the second overhead projector when he talks about the *universal information metaspace* (arrow

1). He then takes 2 seconds to move back to the first overhead projector and says *okay* slightly louder than the preceding talk (arrow 2). His definition of the universal metaspace is followed by a quiet *okay* with falling intonation during which he adjusts the slide (arrow 3). He then moves on with raised pitch and intake of breath to talk about *the notion of subspaces*. The definition is important in describing his model and he appears to use *okays* to bracket a portion of talk from the rest of the section. The first *okay* (arrow 2) resembles an $okay_2$, and the *okay* at the end of the definition (arrow 3) resembles an $okay_1$. Such bracketing is similar to the way in which *okay* was used in Example 3 to bracket an explanation.

A similar bracketing effect occurs in the following example (Example 14).

Example 14
[Ma:12]

(5.0) ((taking slide off and putting onto pile))
t! ((picks up new slide and puts on OHP. title: "Albegbra theories")) uhm¿ .h ↑SO HERE'S SOME OF THE (1.5) sort of uh (2.0) mathematics of (1.0) ((adjusts slide)) uh algebras, and theories, and what they're really doing, and the goal is to (.) or the idea is to describe these structures of spaces, (0.8) uh as collections of sets, and functions. with spec specific properties.↓ ((adjusts slide - going through list on OHT))
(1.5)
(1) —› ↑**okay. so** an algebra is a collection of sets of functions¿ and a theory of presentation¿ or <which i'll just call a theory from now on¿↓> ((adjusts slide)) .h uhm is a way of describing (.)
(2) —› algebras. **okay.** and each theory uh can describe infinitely many algebras¿ (.) ((moves OHP up)) t! uhm¿ (2.) the d- description is done, (.) by ay (.) a theory which has that signature¿ which say (1.0) uh how many sorts (.) how many sets has to be in there, and how many functions. and what are their types¿ t! uhm¿ .h and a set of assertions, ((adjusts slide)) uh about the sets and the functions that they °have to play.° so we say that the algebra satisfies the theory (1.0) uh if it has the same signature, uh and °obeys the assertions.°

(4.5) ((taking slide off and putting on pile))
khh:: ↑OKAY. ((picks up new slide)) SO (1.5) ((puts new slide on OHP. title: 'Orders")) HE:::RE IS AN EXAMPLE¿ (3.0) t! uh we were talking about (.) .h uh orders before, as being one of the sort of structures that we're interested in¿ .....

Once again Mark begins an explanation of a key concept with the second type of *okay* (arrow 1). He then finishes the description of the algebra and the theory of presentation with *okay*, said with falling intonation. He moves straight on to give a further explanation as to the relationship between the two. As in Example 13, the definition is bracketed by $okay_2$ at the beginning of the definition, followed by $okay_1$ at the end of the definition.

A final way in which *okay* occasionally occurs within a section is when the presenter wants to mark a change in footing, by indicating that someone else is talking (Example15).

Example 15
[Ph:6]

..... .h ↑the way a car-following algorithm works,↓ is uhm in ↑heavily congested traffic. the most important thing¿ uhm that governs your speed, is basically the <speed of the car in front.>↓ and so in a discrete event kind of way¿ uhm¿ you wake up¿ you look around ((looks
—› both directions; hands and arms open wide)) and say, **okay.** ((opens hands and arms wide again)) **what's happening. uhm what's the state of the lights¿ uh down the road¿ what's what is the speed uh that (.) what's the maximum speed of the road i'm on¿ and most importantly, ↑how far away, is the car in front. and what speed are they doing.↓**.....

In this example Paul marks the talk of a mythical driver by *okay* (arrow). The driver wakes up and asks a number of questions (bold), *what's happening¿ what's the state of the lights¿ what's the maximum speed of the road i'm on¿ how far away is the car in front¿* In this example, *okay*, said with falling intonation, at the same volume and pitch as surrounding talk, and not surrounded by pauses, marks the fact that someone else, not the presenter, is asking these questions.

A further example illustrates this use of *okay* (Example 16).

Example 16
[Ph:10]

(2.5)
.h uhm¿ (0.8) we've ((vaguely points)) also been working on close (renegotiation) of of uhm the scats, uhm (.) system¿ uhm¿ part of the uhm the intellegence that's in the scats box, that's sitting down in sydney¿ is is what's called the the local controller. and this is the uhm this the logic that determines uhm things like uhm¿ if there's no cars passed the detector for three seconds¿ uhm¿ the controller will uhm on it's own¿ without talking to the central computer¿
—› **will say okay. i don't need to show green for that direction any more.** <it cuts off that green, and goes onto it's °next stage.°> uhm¿ and it scoops up all of the s:: uh time that it can, and gives that to what it's been told is the most important direction. ↓so if you've got a main arterial road, and a cross road it'll save as much time as it can on the cross road and °<give it all to the main main road.>°↑ so we've got the crode ((points to screen)) the code that emulates that logic, and we're put <we're in the middle of putting that into> uh (2.0) °tritram.°
(1.5)

In this example *okay* is used to mark a change in footing, when the controller says *i don't need to show green for that direction any more.* As before, it is incorporated into the surrounding talk, in that it is said at the same volume and pitch and no pauses are evident.

The way in which *okay* functions in the middle of a section contrasts with how *okay* more frequently occurs at the boundary. In this median position, *okay* is generally said at the same pitch and volume as the surrounding talk, it may be said with rising intonation, it is generally not surrounded by pauses and is not associated with changing slides on the overhead. In this position, it is used to check the audience's understanding of a difficult

point (Examples 11 and 12), to bracket an important definition or explanation (Examples 13 and 14), or to mark when someone else is talking (Examples 15 and 16).

2.4 Use of *alright* and *right* in seminar talk

Alright and *right* are generally accepted as being variants of *okay* (Schegloff 1995:117, Schegloff and Sacks 1973). As Table 4 indicates, some presenters choose to occasionally use *alright* and *right* in their seminars, although no presenter uses them to the exclusion of *okay*.

Presenters	Variants of *okay*		
	okay	*alright*	*right*
Mark	48	4	1
Mitchell	33	13	5
Andrew	22	0	0
Paul	27	1	0
Oswald	18	3	5
Roger	1	0	0

Table 4: *Number of times* okay, alright *and* right *are used by 6 presenters*

The table indicates the frequency with which *alright* and *right* are used by the various presenters. Although the three markers are functionally similar, the following analysis will show how, in particular situations, presenters seem to have preference for either *okay*, *alright* or *right*. However, because there are only a few examples of *alright* and even fewer of *right*, the following discussion can only hint at how these words are used in seminar talk.

Alright seems to be used in a similar way to *okay* at the boundary, although it appears to have a closer connection with the presenter's use of the computer. The following example shows how it can occur with quieter volume at the end of a talk or activity in a similar way to *okay*$_1$ (Example 17).

Example 17
[Mi:22]

Pres: ..... now this time i you probably can't see it because the framing's not quite right, but <<i've now got another piece of rope on the other side of the frame to try and stabilise it.>> the problem is that i ((walks to screen)) have to pull this this string here, ((points to screen)) to get the pin out. uh and that causes ((walks back to computer)) a serious tug on the whole frame. (.) °here we go¿° and you can also see all the mud. ((video finishes))

and after we'd done this one, my son said to me, daddy¿ why don't we put a bit of wood underneath¿ so it doesn't spray mud everywhere. i thought, °you know yeah. ((thumbs up sign)) that's a pretty

—→ Pres: cle [ver idea too.° (2.0) ((a few laughs)) °**orright.**° [=
Action: [starts working on computer ---------- continues for 30 seconds ------
Screen: [icons change at bottom of screen

Pres: =now this is really quite a good ((still working on conputer)) one. because, quite by accident, we got a an image of it, <u>just</u> as the pin comes out. (6.0) ((still working on computer)) °what i need of course. is the division's uhm end peg system, which will go backwards. so when i overshoot by a couple of frames, i can wind it back.° (.) it's only available on a sun environment.
(4.0) ((still working on computer))

Most frequently, this type of *alright* is said following the showing of a video segment, as in the above example. This presenter operates the video via the computer. The segment is shown, the presenter comments on what his son said, and he starts working on the computer during the word *clever* (arrow). After a 2 second pause, during which there are a few laughs, Mitchell says a quiet, unstressed *alright* with falling intonation (bold). The icon on the video image changes just afterwards. He then continues to work on the computer for 30 seconds before the new section commences.

This example illustrates how Mitchell uses $alright_1$ to close off a video segment. It is always said quietly, with falling intonation, at the end of the segment. It is generally associated with clicking on the mouse, resulting in a change of image. It therefore plays a closing off role and enables the next part to continue.

The following example is slightly more complicated in that there is a false start at the beginning of a section. However, it shows again how $alright_1$ is used as well as an $okay_2$ (Example 18).

Example 18
[Mi:8]

(2.0)
Pres: anyone want to see the video again?
Aud: °yeh ye:: [:h.°
Pres: [<i like just like the sound of it. it's just such a terrific> °sorry, hang on. i'll have to plug in again.° ((clears throat)) i don't know where where the sort of the twang comes from, ↓it's really quite a nice noise though.↑ °here we go.°
(5.0) ((starts video))
↓complete with sound effects from my family.↑ (.) it had been a long afternoon. °this was one of only a few successful flights¿° ((video finishes))

(1) —→ Pres: (2.0) [(2.0) °**alright.**° [(4.0) [**okay.so=**
Action: [starts work on computer
Screen: [icon changes; video image disappears [

(2) —› Pres: =that's uhm wh- <as i said there's a three litre bottle¿ one litre of water at 60 p-s-i. (1.0) ((looks at screen)) the funny thing is that as i-i pumped it up to 90, but in fact it became aerodynamically unstable, and °didn't fly at all well.°>

(3) —› Pres: [(2.5) °**alrigh** [t this one.=
Action: [starts to work on computer
Screen: [image on screen changes

(4) —› Pres: =SO. THREE PHASES OF FLIGHT. ↑when the water's coming out the end¿ when the air comes out¿↓ and finally when it's just coasting through the air.....

In this example the video finishes and Mitchell pauses 2 seconds before starting to work on the computer. He says a quiet *alright* with falling intonation (bold, arrow 1) and the icon on the screen changes. The video image disappears shortly after. He then says a louder $okay_2$ with falling intonation (bold, arrow 1), followed by *so that's uhm wh-*. The uncertain start moves quickly into faster talk (arrow 2) leading to the end of the section. At the end of this very short section, there is a 2.5 second pause during which he works on the computer. He says another quiet *alright* (arrow 3) as a new image appears on the screen, followed by a quiet *this one*, before he commences the new section.

This example resembles Examples 9 and 10, where two *okays* are said in close proximity. $Alright_1$ closes off the video segment. It is associated with clicking on the mouse to create a new image, enabling further talk to continue. $Okay_2$ closes off the previous pause and indicates readiness to move onto the new topic. At the end of the short section, $alright_1$ once again closes the previous section off by creating a new image, enabling the new section to commence.

Just as *alright* can occur at the end of a section in a similar way to $okay_1$, *alright* can also occur at the beginning of a section in a similar way to $okay_2$, although in the data it always occurs as a composite with another discourse marker in this position (Example 19).

Example 19
[Mi:6]

Pres: ..... ° it turns out that the guy who works there who's interested, his brother-in-law owns a scuba shop. °so ((flaps hand into air)) that's the connection there.°

(2.0)
—› Pres: **ALRIGH** [T. uhm¿ (1.0) now what i'm going to do, [=
Action: [clicks on mouse [walks over to where demo is
Screen: [new image on screen

Pres: =just so you know what it's all about¿ we're going to have a demonstration inside¿ rest assured we have tried this already¿ an' we've only broken it twice.
(5.0) ((starts experiment - it's very noisy))
THIS IS JUST COMPRESSED AIR AND IT GOES OFF AT ABOUT 40 P-S-I.
(6.0) ((experiment continues))
TWENTY¿ THIRTY¿
(8.0) ((experiment continues))

FORTY¿ (2.0) IT'S MOVING,
(7.0) ((rocket pops off and presenter turns machine off))
so that's a ((walking back to pick up rocket, looking at audience)) a fairly small bottle¿
with no water¿ uhm and at a fairly low pressure.
(4.0) ((picks up rocket))

In this example, Mitchell has just finished describing the rocket and is about to give a demonstration of how it can move across the room. He says *alright* with falling intonation and in a louder voice (arrow), followed by *uhm¿ now what i'm going to do....* As he says *alright* he clicks on the mouse to create a new image on the screen. This resembles the second type of *okay* which both closes off the previous part, as indicated by falling intonation together with clicking on the mouse, and indicates by louder voice a readiness to commence the next section.

A further example illustrates the second type of *alright* (Example 20).

Example 20
[Mi:16]

Pres: ..... and this thing over here is called the drag ((points to screen)) coefficient. and you ((walks back to computer)) »determine the drag coefficient essentially experimentally, although i suppose today you could °do it using uh computational fluid dynamics °i don't know but i guess a an answer that way.°

Pres: (1.0) [(1.5) °woops°] (2.0)=
Action: [starts to work on computer]
Screen: [icon flickering]

—› Pres: =↑**ALRIGHT.** SO THAT'S HOW WE CALCULATE THE DRAG. now newton's second law says that uhm the time rate change of velocity, or acceleration¿ is the force¿ applied¿ divided by the mass of the object being accelerated. in our case (.) the force being applied is the reaction force¿ minus the drag force¿ minus the gravity force.↓.....

In this example, Mitchell pauses for 1 second and then works on the computer, causing icons to flicker on the screen. He then says a quiet *woops* and finishes working on the computer. He pauses for 2 seconds and then says *alright* in a louder voice and with raised pitch and with falling intonation (arrow).

Alright can also be used to check that the audience follows, resembling the way in which rising intonation *okay* is used as a checking device (Example 21).

Example 21
[Mi:13]

Pres: ↑so we simply make these substitutions¿↓ and lo and behold¿ we come up with an ((points to screen)) equation¿ ((goes back to computer)) which gives us the ↑variation of pressure¿ in the bottle¿ over time¿↓ (1.5) uhm¿ (2.5) it's simply a function of the uhm

(1) —› value of k¿ and the initial pressure. (2.5) ↑**now you don't need to necessarily follow all that¿**↓ »<all you have to do is just agree with me, that it's correct.> (.) subject to the assumption of uh °constant temperature°.

(2.5)

(2) —› Pres: ↑**al [right?** and so what you can do is, you can solve that equation numerically¿↓=
Action: [clicks on mouse
Screen: [new image appears

Pres: =going back actually¿ °uhm¿° (2.0) any ↓mathematicians in the audience who'd like to put their hands up¿ come up with an analytic solution¿ i'll be very happy to do so at the end¿↑ uhm¿ but solving ((new image)) it numerically .....

In this example it is clear that Mitchell is encouraging the audience to follow his reasoning. He makes the comment *you don't need to necessarily follow all that¿* (arrow 1). He then commences the new section *alright* said with rising intonation (arrow 2). Once again, *alright* simultaneously indicates a number of things. It plays a checking role, it closes off a pause where the audience had an opportunity to ask questions, it coincides with him clicking on the mouse to create a new image, and it enables him to move onto further talk.

A further example indicates how *alright* can be used to check that there are no further questions (Example 22).

Example 22
[Mi:23]

Pres: yes it feels cold. it doesn't feel freezing, but it's certainly cool, uhm¿ i suspect that ((walks over to screen)) the mist inside the bottle, is probably a bit of a con. because it's probably pretty saturated anyway, so you get lots of condensation with a fairly small temperature drop¿ ((walks back to computer))
Aud1: ( ) the air has a chance to cool down. as it heats up
it ( )
Pres: mhm.
Aud1: taking awhile. you know it has time to cool down to room temperature
( )
(1) —› Pres: **right.**
Aud1: ( )
(2) —› Pres: **right.**
Aud2: but there's there's probably a lot of just plain spray in there as well. ((presenter shrugs shoulders)) that's not condensation at all.
(3) —› Pres: yeah, t! (2.0) ((looks at computer))
alright? ((puts down pointer and starts to work on computer)) and the last one i'd like you to show you, is just uhm, more for humour, more than anything else, (3.0) which is uhm (.) °this one here¿° (6.0) uhm¿ this is (.) this one litre of water, pumped up to i think¿ 110 p-s-i. (.) uhm¿ and it's really, i didn't bother measuring it because, (.) uhm there was so much problems, (3.0) ((audience laughs)) °uh c-s-o. that's that° ((video finishes))

At the beginning of this example, Mitchell uses *right* as a response token during questions from the audience (arrow 1 and 2). *Right* seems to be the preferred way in seminar talk of

indicating acknowledgement or understanding of what has been said, although occasionally *okay* is used in this role.

After the comment from the second audience member Mitchell says *yeah* followed by a dental click (arrow 3), followed by a 2 second pause, during which he looks at the computer. He then says *alright* with rising intonation, puts his pointer down and starts working on the computer. Once again, as he says *alright*, he is simultaneously checking that there are no further comments, closing off the Q-A interaction, and putting the pointer down to enable further work on the computer. He then goes straight on to show the last video segment.

The above examples (Examples 17-22) give an indication of how *alright* functions with falling intonation at the boundary, and with rising intonation as a checking device. The analysis indicates its similarity to the way in which *okay* functions, although *alright* tends to be used in specific situations. Mitchell, who uses *alright* most frequently, is the only presenter who uses a video image. His use of *alright* tends to be associated with the use of the computer, which also operates the video. *Alright*$_1$ tends to follow an interaction with the video (Examples 17 and 18), yet at the same time is associated with creating a new image on the screen. It could be that Mitchell chooses to say *alright*$_1$ when operating the more technically difficult aspects of the computer, such as operating the video.

Mitchell also uses *alright*$_2$ at the beginning of a section in a similar way to *okay*$_2$ (Example 19 and 20) and in fact appears to use *alright*$_2$ to mark the main points of his talk, reserving *okay* for the sub-points. This is evident in Example 19, where *alright* marks the beginning of the demonstration phase of his talk. In addition, *alright* can be said with rising intonation when checking for questions or whether the audience follows the talk (Example 21 and 22).

A final comment relates to how, given their functional similarity, *alright* and *right* can be used in the place of *okay*. We saw earlier that *okay* tends not to be repeated and that if two *okays* are in close proximity to each other, the first is *okay*$_1$ and the second *okay*$_2$. There is one instance in the data where all three markers are in close proximity (Example 23).

Example 23
[Ma:12]

Pres: (2.5) uhm¿
(2.0)
h (0.8) .h ↑so ((picks up new slide)) I'M NOW GOING TO GO ON AND TALK ABOUT (1.0) ((puts new slide onto OHP. title: "Algenon")) uh (2.0) algenon¿↓ (.) which is a language i've developed¿ to solve this (2.0) u::h general description

(1) —› problem¿ uhm¿ .h »**but i thought i might pause at this stage¿** in case, <we've still got quite a long way to go,> so in case anybody wanted to have a stretch or anybody had any questions or comments °that they'd like to rai:se, at this ti:me before we go o::n¿° ((looks at audience))

(2) —› Pres: [(2.0) ° i'll have a drink.° [(7.0) [**<okay. had your chance.>** [(1.0)=
Action: [looks at audience [drinks [walks back to OHP [someone laughs

(3) —› Pres: =↑**ALRIGHT¿** (2.0)
(4) —› t! **RIGHT.** i say i've developed algenon¿↓ ((points to OHP)) of course i didn't really¿ uhm¿ it's ↑based on algebraic specification techniques, which are quite old¿ .h uhm¿ and it's based on, in particular, the (larch) shared language↓ uh <which is a particular algebraic specification language¿> which i thought was (.) it <seemed to be a lot better than all the other ones,> for what i was trying to do. ....

Mark only uses *alright* a few times in his seminar, either as an acknowledgement token (similar to Example 22) or indicating that the subsequent talk is being said by someone else (similar to Example 15 and 16). However, this example is different. He initially tells the audience that he is going to pause for questions (arrow 1). He then pauses for 7 seconds while he has a drink. No-one asks any questions and he says *okay. had your chance* quite quickly as he walks back to the overhead projector (arrow 2). By so doing he indicates that the pause is over and that he is ready to re-commence. He then pauses for a further 1 second, and someone in the audience laughs. He then says *alright* in a louder, raised pitch voice and with rising intonation (arrow 3). At this point he is checking that there really are no questions, yet simultaneously indicating by the increased prominence that he is ready to commence the next section. Finally he commences the next section with $right_2$ said with falling intonation (arrow 4). It is unusual to use *right* at the beginning of a section in this way. In these seminars *right* is generally reserved for a response token. Yet it would appear that there is a reluctance to repeat *okay* at this point, as $okay_2$ has already been said a few words previously (arrow 2). In this position, *right* is clearly functioning in a similar way to $okay_2$.

Okay, alright and *right* therefore seem to be functionally similar, although presenters have preferences, initially whether to use these markers at all and secondly, if they *do* use these markers, which marker to use in particular situations. Mitchell, the most frequent user of *alright*, uses it in close association with the computer, particularly at the close of a video segment, and as a checking device. He also uses *alright* to mark the important points in his talk. Its complicated function deserves further investigation, although unfortunately due to the limited number of examples in the present study, it is only possible to hint at how *alright* functions in seminar talk.

2.5 Conclusion

Okay is an important discourse marker in seminar talk, as indicated by its prevalence at the beginning of a section. As the initial word in a section, it plays an important structuring role, by closing off the previous section, or pause between the sections, or the previous image on the screen, yet at the same time indicating readiness to move onto the new topic in the following section. This double function is particularly useful in seminar talk, enabling the presenter to effectively and efficiently connect prior and subsequent talk.

The above analysis has shown how in seminar talk, *okay's* function resembles *okay* in preclosing environments and as topic initiator in telephone conversations. It also resembles its use in institutional talk, where *okay* often occurs in teaching routines. Although not all speakers choose to use the discourse marker, *okay*, the analysis has shown that if they *do* use *okay*, its occurrence is not random, it occurs systematically in three different environments. Depending upon that environment, *okay* has a specific role or function. Its most important role is at the beginning of a section, where its double function is most obvious. It can also be associated with the end of a section, where it mainly plays a closing off role. Finally, it can have quite a different function, that of a checking role, characterized by rising intonation. Some speakers also choose to use the functionally similar discourse markers, *alright* and *right*, utilizing them within the discourse for specific functions.

The analysis has also demonstrated the close integration of action and talk. The discourse marker, *okay*, is closely associated with changing the image on the screen. Either this is done via the computer, in which case *okay* is said while clicking on the mouse, or after the mouse has been clicked and the new image is actually on the screen. Alternatively, there is a four-part action involved in putting the new image on the screen. *Okay* may be associated with the first three actions, that of taking the old slide off, putting it on the pile or picking up the new slide. It is not generally associated with putting the new slide on the projector. As we shall see in Chapter 4, that action is reserved for the discourse marker, *uhm*. Individual presenters seem to have preferences as to which action they mark by *okay*, the only 'rule' being that as a minimum, *okay* is said after the old slide has been taken off.

This chapter has only looked at the situation in which *okay* (and *alright*) occurs on its own, rather than in combination with other discourse markers. However, a common composite at the beginning of a section is *okay so*. The following chapter will initially analyse *so* in order that the combination *okay so* may be analysed in more detail.

Chapter 3
So as Discourse Marker

3.1 Introduction

Chapter Two discussed the role and function of *okay* as a boundary device between two sections. Another lexical item which also occurs in this position is *so*. *So* can either occur alone at the boundary, or in combination with other lexical items, such as *okay* and *uhm*. Because the composite *okay so* plays an important role in seminar talk, indicating the macrostructure of the talk, any analysis of *so* must take into consideration how it functions both on its own and in combination.[1]

Schiffrin (1987:201) discusses how *so* ties adjoining clauses together, by conveying the semantic meaning of 'result', realised at a textual level by marking fact-based, knowledge-based or action-based causal relations. In the data there are clear examples of *so* being used in this resultative sense (Example 1).

Example 1
(Ph:12)

.h okay. the other thing that's been uhm occupying us¿ is uhm validation¿ uhm¿ (2.5) in uhm hong kong. uh we've been we've been able to get some uh real data from a street network in hong kong. uhm where scats was uhm recently commissioned¿ uh the hong kong government wanted to be sure that scats would actually improve¿ or <do something to the improve> the
—> traffic. **so they conducted a a series of tests¿** where they controlled it with a fixed time system¿ uh one day¿ and then uh the scats of that did control the system the next. uhm and measured uh the improvement. or otherwise. uh that the scats made. uhm¿ (4.5) ((looks at screen)).....

In this example, Paul is describing validation tests in Hong Kong. The research team wanted to test the usefulness of 'scats' in actual traffic, in order to see if it would improve the traffic situation. *So* (therefore) *they conducted a series of tests* (arrow). The *so* clause is the direct action-based result of the previous clauses.

However, *so* does not simply function in a resultative sense. Discussions of discourse markers (Schiffrin 1987, Fraser 1990, Segel, Duchan and Scott 1991, Jucker 1993, Flowerdew and Tauroza 1995) draw a distinction between the syntactic function of particular lexical items and, as Schiffrin terms it, their pragmatic function (Schiffrin 1987: 27-28). It is this pragmatic function, how lexical items function as discourse markers, that

[1] Examination of *uhm so* as well as other combinations, will be carried out in Chapter 4, after *uhm* has been analysed.

is of concern to us in this research. Although syntactically[2] *so* indicates result, the subsequent analysis will show that in specific environments in seminar talk *so* also functions as discourse marker.

The various discussions of *so* as discourse marker have lead to a variety of interpretations. Schiffrin's (1987: 194) research is based on an examination of a number of discourse markers in unstructured interview conversations. She discusses how *so* functions structurally at both a local and global level in explanations and in narratives. At a local level *so* has a narrow scope, referring to the immediately preceding clauses, whereas at a global level, *so* has a wide scope, indicating its relationship to a whole stretch of discourse. She also discusses (Schiffrin 1987: 217) its pragmatic function as turn-transition device, marking the speaker's readiness to relinquish a turn, resulting either from an explanation[3] (Schiffrin 1987: 220) or more commonly, as an explicit turnover phrase, for example, *so what have you organised?* (Schiffrin 1987: 219). The pragmatic function of *so*, marking the transition from one communicative function to another, is also noted by Flowerdew and Tauroza (1995: 438) when examining the effect of discourse markers on second language lecture comprehension.

Fraser (1990) in discussing discourse markers within the grammar of a language, interprets *so* as being a type of commentary pragmatic marker, signalling how the speaker intends the message that follows to relate to the prior discourse (Fraser 1990: 387). The core meaning of *so* indicates that the following talk has a consequential relationship to the prior material (Fraser 1990: 394). He explains how many expressions that function as discourse markers are ambiguous in that they can also function as different syntactic types on other occasions. He therefore disagrees with Schiffrin (1987: 314) who holds that discourse markers can simultaneously function syntactically, as in the case of *so* showing result, and pragamatically as discourse marker. Fraser (1990: 389) holds that when discourse markers occur they *only* function as a discourse marker and not in their syntactic sense. Therefore discourse markers have no effect on the content meaning of a sentence and their presence or absence does not alter the discourse relationship between the message which follows and the foregoing discourse.

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[2] Schiffrin (1987: 210) talks about the *semantic* meaning of *so* conveying the meaning of result, in contrast to its *pragmatic* meaning as discourse marker. I have chosen, however, to discuss the resultative sense of *so* as its *syntactic* function, in that *all* the uses of *so* are in some sense semantic.

[3] The following example from Schiffrin (1987: 219) illustrates a not very explicit turnover phrase, which may not result in speaker change.

Example 42:

Henry: so: eh ..... but we buy beer and ..... cake and
that's- we spend it out of our own money.
so: eh:

This contrasts with the more explicit turnover phrase in the form of a question, marked by *so*. It is this latter phrase that is of interest to us, in that it parallels what occurs in seminar talk.

Segel, Duchan and Scott (1991) analyse discourse markers (interclausal connectives) in the context of adults filling logical or lexical relational words into the simple narrative of a 5 year-old child. In their mental model-deictic shift view, as readers process a stretch of text they interpret it according to a particular frame of reference or mental model. Subsequent text is then continuous or discontinuous with the current material. *So* signals that temporal continuity is preserved (Segel, Duchan and Scott, 1991: 50). In addition to its continuity marking function, they see *so* has having the semantic meaning of informing the reader about why characters do what they do and how they think about it. Therefore *so* can be seen as indicating that the incoming information should be interpreted from the character's subjective perspective. They note however that their view may lack generalizability, in that it does not take Schiffrin's interpretation of *so* as potential turn-transition device into account.

The above overview of previous research highlights some of the difficulties associated with the discourse marker, *so*. For the purposes of this research, Schiffrin's (1987) examination of *so* is most relevant because she analyses the function of discourse markers in actual spoken language. Although seminar talk differs from conversation in that no speaker exchange occurs, Schiffrin's analysis provides a point of comparison, enabling discussion of similarities and differences between the function of *so* in the two-way conversation and in the monologue.

In terms of whether *so* can simultaneously function syntactically and pragmatically, the approach taken by this analysis is to only analyse those examples of *so* that are clearly *not* functioning in a resultative sense. Consequently, the analysis of the role and function of *so* as discourse marker is unencumbered by any suggestion that *so* may also be indicating a causal connection. Table 1 gives a breakdown of the number of *so's* functioning as discourse marker and the number of *so's* functioning in a resultative sense.

Presenters	*So* in Seminar Talk	
	so used as discourse marker	*so* used in its resultative sense
Mark	103	19
Mitchell	89	34
Andrew	43	4
Paul	65	12
Oswald	103	28
Roger	19	5

Table 1: *Number of times* so *is used as discourse marker and in its resultative sense for the 6 speakers*

The distribution of *so* in seminar talk is more varied than *okay*. It can occur in three distinct positions, and it functions quite differently in each (Example 2).

Example 2
(Ma:1)

..... providing some formal basis for this for these things, is a way of uh it's not it's not the ultimate solution to everything, °it's just uh one °you know° step in providing better ((starts to take slide off)) interaction.°

(1.0)
uhm¿ (2.0) ((puts on pile))
(1) —> t! **so** ((picks up new slide)) what is an information ((puts new slide on OHP. title: "information display")) display? well i spent about half an hour at my confirmation seminar
(2) —> talking about that¿ **so** i'm not going to uh not going to repeat that¿ uhm the important facets are that they it's ↑a way of taking some data¿ ((looks at OHP)) t!h mapping it into a perceptual representation¿ that can be then used by a human user¿ to uh perform some task.↓ uh °based on that data.° uh (.) all of the hh (.) displays that we'll look at today are primarily visual displays¿ »but of course as you know there's work going on in this building as we speak on auditory displays¿ and olphatic displays¿ and immersive displays¿ and <all those sorts of things.>
(3) —> **so** hopefully these results will will generalise to those areas.

(2.5) ((takes slide off))
(4) —> ↑**OKAY.** ((puts onto pile)) **SO**↓ (2.0) without any ((walks over to 2nd OHP)) mo::re (1.5) .h introduction, ((turns 2nd OHP on with new slide in place)) i'm going to (.) put up the super model¿ (2.0) t!h uhm¿ .h (1.0) ((coughs)) (.) which is quite a complex thing¿ ↑i've called it a super model because (.) i wanted to (.) sort of encompass a::ll sorts of displays¿ ((arms open
(5) —> wide)) all possible displays¿↓ all possible display models. so it's sort of a super set uh of all
(6) —> those models. (.) uhm¿ <<as a result it's quite complicated¿ so i'm not going to explain it all to you no:w¿ i'm just going to let it sit up there¿ and for the rest of this talk,>> i'll just talk about little bits of it uh as we go along. maybe by the end¿ uhm °some of it (.) ((picks up sheet)) will've soaked into your subconsious.° ((puts sheet on pile))

Example 2 illustrates the distribution of *so* (highlighted in bold). At the beginning of the section, *so* precedes an orientation of what is going to come next (arrow 1). Within the section, *so* can either be used in its resultative sense (arrow 2 and 6) or preceding an

explanation (arrow 5). At the end of the section *so* precedes a resolution (arrow 3). Arrow 4 indicates how *okay so* is used as a composite at the beginning of a section.

The following analysis will initially analyse *so's* function as discourse marker on its own at the beginning of a section, followed by discussion of the *okay so* composite. This will be further followed by a discussion of *so* in the median and final position of a section.

3.2 *So* at the beginning of a section

So occurs frequently at the beginning of a section, either as the first word of the new section or as a composite discourse marker. It orients the audience to the next point (Example 3).

Example 3
(Mi:4)

	Pres:	....uhm <i rang up a-c-i who make most of these in australia, and they said that they should withstand 150 to 180.> (.) quite reliably.=
	Aud:	=([ )
	Pres:	[or the bottle gave in. it really is-i mean <considering you get these ((holds bottle up)) absolutely for nothing. they are all over the place,> it's a quite a °remarkable piece of material.°
		(1.0) ((starts to walk over to the demo table))
—>	Pres:	**SO THAT'S** ((waves bottle in air)) **THAT'S THE FIRST BIT¿** UHM¿ ((looks at demo table)) THE SECOND THING YOU NEED¿ ((picks up plug from demo table)) is ↑you need a thing to go in the end. a plug. (2.0) ((puts plug in end)) uhm¿ and¿ if you're going to withstand a 120 p-s-i, it has to be pretty tight.↓ otherwise you get leaks....

In this example, Mitchell finishes a Q-A exchange, then has a 1 second pause before starting the next point. The new section commences with *SO THAT'S THAT'S THE FIRST BIT¿*, (arrow) said in a louder voice. This phrase orients the audience as to the structure of the talk, by indicating what part has been covered and what the presenter is going to move onto next. It is only following the orientation, that the presenter moves onto the topic of the section, *UHM¿ THE SECOND THING YOU NEED¿*.

At the boundary of a section, a number of things occur in sequence. The previous section is closed off, as indicated by reduced volume, slightly faster talk and falling intonation. This is followed by a pause, during which overhead slides are often changed or the presenter works on the computer. Then the new section commences with louder talk than the preceding section. If the new section begins with *so*, the sequence continues with:

so + orientation + start of new topic

In Example 3, the orientation is *that's the first bit*, followed by the new topic, which commences with *the second thing you need.* The pattern is quite regular. *So* is generally said with prominence, such as louder volume or raised pitch, associated with the beginning of a section. It is always said with level intonation (no intonation marker), and is generally not followed by a pause. It moves straight into the orientation phrase. The orientation lets the audience know where they are within the overall structure of the talk. The orientation works like a pointer: it can refer the audience backwards to what has just been dealt with, as in this case (Example 3); it can also refer the audience forwards to what is about to come; or it can refer the audience (usually by pointing) to something on the screen. It is only *after* the orientation that the presenter actually begins to talk about the new topic.

Using *so* to refer the audience backwards to what has just been covered, is a common way of commencing a new section (Example 4).

Example 4
(Mi:19)

.....<so you get the effect of time lapse. (.) photograph of the rocket taking off.> »now of course this is the case of how to lie, how to lie with statistics. uhm i <could have put the rocket anywhere i liked, and °you wouldn't have noticed.°> uhm trust me. °i tried to do it acurately.°

(2.0)

—> **so that's one way of doing it¿** (2.0) ((turns OHP off)) uhm¿ that takes (.) well not very long, but it's a bit frustrating. the other way of doing it, ((hands out handouts)) is just simply to (.) uhm put up a composite of the frames (.) »on a piece of paper, and <print them out on the printer. and you can> have a look at those....

In this example, the previous section is closed off, there is a two second pause, before the new section starts in a louder voice. The new section commences with *so*, followed by the orientation, *that's one way of doing it* (arrow). The orientation is then followed by a short comment about the frustrating nature of the task, before the start of the new topic, *the other way of doing it.*

Using *so* in this manner connects what has just been covered with what is about to be covered, and resembles written academic discourse at the beginning of a paragraph. The connection is evident not only in terms of content, but also in terms of choice of vocabulary. Symmetry between the orientation and the start of the new topic is shown by the contrast between *one way of doing it* and *the other way of doing it.* A similar symmetry can be seen in Example 3, where *first* contrasts with *second.*

Alternatively, the presenter can refer the audience forwards by simply indicating what is going to be talked about next (Example 5).

Example 5
(Ma:11)

Pres: ..... .h uhm¿ (2.0) t! and that'll be helpful. and of course, as a computer scientist, »i'd like to be able to ((picks up accompanying sheet)) i'd like my computer, ((removes slide)) to understand the
Pres: formalism °as well [i do.°=
Action: [puts slide on pile
(2.5)
Pres: =uhm¿ (2.0) ((picks up new slide))
—> h (0.8) ((moves new slide towards projector)) .h ↑**SO I'M NOW GOING TO GO ON AND TALK ABOUT** (1.0) **uh** ((puts new slide onto OHP. title: "Algenon")) (2.0) **algenon¿↓** (.) which is a language i've developed¿ to solve this (2.0) u::h general description problem¿ uhm¿ .h »but i thought i might pause at this stage¿ in case, <we've still got quite a long way to go,> so in case anybody wanted to have a stretch or anybody had any questions or comments °that they'd like to rai:se, at this time before we go o:n¿° ((looks at audience)) ....

In this example, the audience is simply told what the next point will be: *so NOW I'M GOING TO GO ON AND TALK ABOUT (1.0) uh (2.0) algenon¿* (arrow). Once again, it is clear that *so* is being used to mark the beginning of a section. The preceding section has been closed off, the slide has been removed and put on the pile, there is a 2.5 second pause, followed by *uhm¿*, followed by a further 2 second pause. The presenter commences the new section with *so* with raised pitch voice and increased volume and putting the new overhead slide on the projector. He then orients the audience as to the new topic in a louder voice.

This is the first example in which *so* is associated with overhead slides, enabling us to examine how they are integrated into the discourse. There does not appear to be any strict pattern as to how the presenter interacts with the overheads, although there are features in common. In this example (Example 5), the old slide is taken off the projector and put onto the pile of used overhead slides towards the end of the previous section. The new overhead slide is picked up during the pause and moved towards the projector as the presenter says the orientation phrase. It is placed on the screen just before the end of the orientation phrase. There is a pattern for when the slides are placed on the projector, with two things being fixed. The old slide is taken off either at the end of the preceding section, or during the pause. The new slide is placed on the overhead projector before the end of the orientation, so that by the time the presenter is ready to start the new topic, the new slide is in place.

The presenter can also orient the audience by asking a question (Example 6).

Example 6
(Ma:23)

Pres: ..... and have an algorithm to produce the right scene to be rendered to produce the »structure of the scene ((walks to OHP)) °that you you wanted.°

Pres: so it's uhm [(0.8) sort of difficul [t. (2.0)
Action: [picks up sheet [old slide off

(1) —> Pres: **↑SO HOW DOES THE UH↓** [(2.5) **how does the (.)=**
Action: [puts onto pile and picks up new one

Pres: **= mo [del and the algebra help you do that¿=**
Action: [puts new slide onto OHP. title: "Algebra & search"

(2) —>Pres: =↓well it sort of doesn't. actually¿ unfortunately¿↑ (1.0) uhm¿ (1.5) t! because the spaces are here, ((points to OHP)) maybe these are scene spaces, and this is the space of all algebras, ↓well the things that are sensible scenes are a long way apart, and <once you've done one they don't really tell you how to get to another °one.>=...

This example shows how the presenter starts the new section in a louder, raised pitch voice, with *SO HOW DOES THE UH (2.5) how does the model and the algebra help you do that¿* (arrow 1). In this case, the presenter indicates to the audience what is about to be covered, by asking a 'rhetorical question'.[4] The rhetorical question refers forward by introducing the concept of *the model and the algebra*, yet also refers back to the previous section by use of the term *that*.

Using rhetorical questions in this manner is the most common orientation method, with the audience being concisely informed as to the topic of the new section. In addition, it mirrors the way in which *so* is used in conversation as a turn-transition device (Schiffrin 1987:219). A speaker prefaces a question with *so* to indicate to the other person that they wish them to take the floor. An explicit 'turnover phrase' such as a question generally results in the other speaker taking the floor. In seminar talk, although *so* functions similarly as a means of introducing a new topic, it does not function as a turn transition device because the presenter goes on to answer his/her own question. The answer to the question becomes the start of the new topic, typically marked by *well* as in Example 6, *well it sort of doesn't* (arrow 2).

Mark's use of overhead slides is once again integrated into the discourse (Example 6). The old slide is taken off during last part of the previous section and the pause. It is put on the pile part way through the rhetorical question. The new slide is picked up at the same time and placed on the overhead projector before the end of the orientation phrase, in this case, before the end of the rhetorical question. This accords with the pattern, that the new slide is in place before the new topic commences.

[4] I have chosen to use the term 'rhetorical question' to refer to this type of question, following Flowerdew and Miller (1997: 40). Although technically not a rhetorical question, in that the presenter goes on to answer it, the term is useful in that it conveys the sense of what is going. It is clearly unlike a normal question in a Q-A sequence.

A further example illustrates the way in which a rhetorical question can be used as orientation (Example 7).

Example 7
(Mi:9)

..... now viscosity gets into this in a little way¿ you can <take into account viscosity by sticking ((points to screen)) an extra term over here¿> which is uhm ((starts to walk back to computer)) the losses due to viscosity. (1.0) ((still walking back to computer)) °but we won't ((waves hand in air)) worry about that.°

(1.5)
—> **so how do we apply this to** ((new image)) **the rocket?** ↑well in the rocket¿ we start off up the top ((points to screen)) here¿ we've got a pressure in the fluid is essentially pressure of the gas. the pressure actually↓ gets a little bit more as you go down. but <compared to the pressure of the gas it's insig insig insignificant¿> .....

In this example, the presenter asks the rhetorical question *so how do we apply this to the rocket?* (arrow). The word, *this,* refers back to the previous section in which he talks about the different elements contributing to the energy of the fluid. The question also refers forwards by indicating what the new topic will be. As in Example 6, the presenter marks the answer to the question with *well.....* In addition, the new image is on the screen before the orientation is completed. In the case of computer image, the four steps (taking off the old slide and putting it on the pile; picking up the new slide and putting it on the projector) converge into one. However, the principle remains the same. By the time the presenter is ready to commence the new topic, the new image is in place.

The presenter can also use the overhead slide as a point of reference to orient the audience, as in the following example (Example 8).

Example 8
(Ma:8)

..... and »we find an isomorphic scene by searching through uh the library. <°to find an appropriate scene to display uh the information.°>

(4.5) ((takes slide off, puts onto pile and places new slide onto OHP. title: "General strategy"))
—> .h ↑**SO THE GENERAL STRATEGY,** (0.8) ((adjusting slide)) **uh that these two systems, uh represent,** is really (.) to FIND ((points to OHP)) (.) uhm some little corner, (.) of scene space, which you know about fairly well,↓.....

In this example, the orientation phrase *SO THE GENERAL STRATEGY...* refers directly to the title of the slide projected onto the screen (arrow). For an orientation such as this to be effective, the new overhead slide needs to be already visible to the audience. In this example, it is put up onto the screen during the pause between the two sections. The

presenter repeats the words in the title and also points to the screen to make sure the audience is orientated towards what he is talking about (Figure 1).

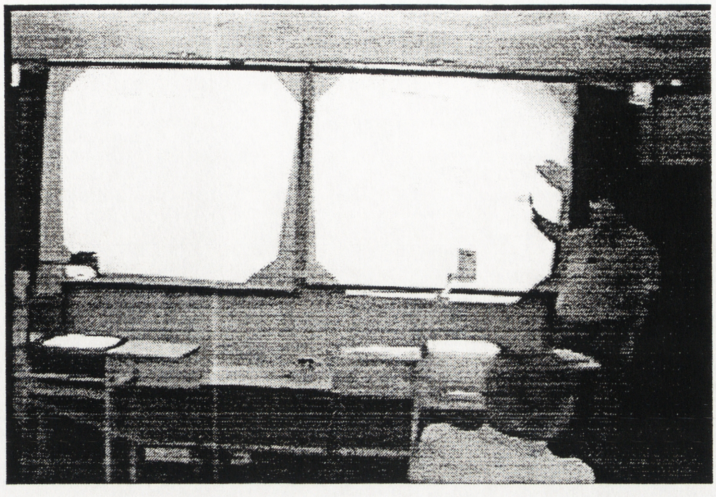

Figure 1: *SO THE GENERAL STRATEGY, (0.8) uh that these two systems, uh represent, is really (.) to FIND (.) uhm some little corner....*

The following example further illustrates how the presenter can orient the audience by directly referring to the overhead slide (Example 9).

Example 9
(Ma:6)

..... so: the user sees the structure, which is two (.) two ((points to OHP)) surfaces. (main) »and that's obviously ((takes off slide)) °<different from the display ((puts slide onto pile)) structure.>°

(1.5) .h uhm::¿ ((puts new slide on OHP))
(1.5)
—> t! **so here's a sort of 3-d example**, uh this is ay ((points to OHP)) uh a sort of fluid flow probe¿ which you use in digitilisation insertion. and it sort of bends and twists according to uh the fluid flow. and so rather than seeing that as well <as a collection of a cone and a thing¿> you see high level features of it. ....

Once again, the new slide is put in place during the pause between the sections. The presenter then commences the section with a dental click followed by *so here's a sort of 3-d example* (arrow). The presenter is referring directly to the image on the screen. He then starts the new topic *this is a sort of fluid flow probe¿* during which he points to the overhead screen, to make it clear that he is talking about the overhead.

At the beginning of a section, *so* orients the audience as to what has been covered, or what the next point is going to be about, before actually moving on to the new topic. The orientation lets the audience know where they are within the overall structure of the talk. It can refer backwards to what has just been covered, it can refer forwards to what is about to

come, it can refer to something on the screen, or the presenter can ask a rhetorical question which he then answers. The presenter only begins to commence the new topic after the audience has been oriented as to what the topic is about and the new image is on the screen.

3.3 *Okay so* at the beginning of a section

In order to examine the function of *so* at the beginning of a section it was necessary to look at *so* in isolation. It is now possible to analyse the composite *okay so* in this position.

Table 2 shows the number of times the combination *okay so* is used for the six speakers. As can be seen from the table, some presenters have a preference for this combination, for example Mark, whereas other presenters, for example Andrew and Roger, seldom use it, if at all. When we look at the discourse marker, *uhm* (Chapter 4), we will see that these two latter presenters tend to use *uhm* to indicate the structure of the talk.

Presenters	***Okay so* used in Combination**
Mark	29
Mitchell	10
Andrew	1
Paul	10
Oswald	6
Roger	0

Table 2: *Number of times* okay so *occurs for the 6 speakers*

Due to the frequency with which the composite *okay so* occurs in seminar talk, it is necessary to analyse whether *okay so* functions as a separate unit, as a single discourse marker at the beginning of sections, or whether *okay* and *so* simply occur together in this position, while maintaining their individual functions. The analysis shows the latter is the case. Although *okay* and *so* often occur in combination at the beginning of a section, they clearly function separately, with *okay* still playing the double role of closing off and indicating topic shift, and *so* playing the orientation role. The individual functions of *okay* and *so* are not influenced by the presence of the other marker. This can be demonstrated by looking at how the composite functions within seminar talk.

When *okay* occurs by itself as the first word of a section, it functions as $okay_2$ (discussed in Chapter 2), playing the double role of closing off and simultaneously indicating topic

shift. When *so* occurs by itself, it plays an orientation role, by referring the audience in a number of directions, backwards to what has just been dealt with, forwards to what is about to come, to the overhead projector, or both backwards and forwards in the form of a rhetorical question. The following analysis will show that even when part of the composite, *okay* and *so* function in exactly the same way.

The following example illustrates *so* referring backwards (Example 10).

Example 10
(Mi:19)

..... but when it gets very rough, you want to slow down. °i didn't bother with that bit. i uhm just simply used up computer time.° uhm¿ for example¿ °the graphs on there takes point one of a second or something or other. on spark two. so. ((flops hands into air)) who cares.°

(1.0) ((new image))
(2.0)
—> t! ↑**OKAY. SO THAT'S the water thrust phase.** the next bit of the rocket, is the air thrust phase. and basically i didn't bother.↓ uhm¿ i suspect i should have tried harder, but one of the difficulties is that although it's constant volume¿ the pressure is a function of time¿ and the density's a function of time. °uhm° which makes it a little bit more harder to analyse. i don't think benooly's equation applies. or certainly not in linear form.....

The presenter commences the section with a dental click followed by with *okay so* said with raised pitch and increased volume (arrow). *Okay* closes off the previous part while indicating readiness to commence the new section. *So* retains its orienting function of referring backwards to what has just been covered: *THAT'S the water thrust phase,* followed by the start of the new topic: *the next bit of the rocket, is the air thrust phase.* This accords with the way in which both *okay* and *so* function when they occur in isolation. In other words, the fact that *okay* precedes *so* does not influence the function of *so*.

So can also refer forwards by indicating the next topic (Example 11).

Example 11
(Ma:23)

Pres: .h so: the model sort of (4.0) ((alarm goes off)) tells you uhm (.) uh where you are¿ ((walks to OHP)) <°but it doesn't really tell you where to go.°>

(3.5) ((takes slide off and puts onto pile))
(1) —> Pres: ↑ **.h oka [y. so:** [(1.0)=
Action: [picks up new slide [puts new slide onto OHP. title: "Issues"

(2) —> Pres: **=just wrapping up¿** some of the uh some of the issues↓ are that are sort of foremost¿ are (.) kh: ↑the fact that this model is a is a purely descriptive framework. .....

In this example, the new section commences with raised pitch following an intake of breath. The presenter says *okay* with falling intonation (arrow 1), both closing off the

previous part and simultaneously indicating topic shift. *Okay* is immediately followed by *so* and the orientation phrase, *just wrapping up¿* (arrow 2) to let the audience know what the presenter is about to talk about next. This section is near the end of the talk and will bring it to a close. The presence of *okay* at the beginning of the section does not affect the function of *so*.

In the case where the orientation is a rhetorical question, *so* and *okay* again retain their individual functions (Example 12).

Example 12
(Ph:1)

Pres: ..... on the team are uh peter lamb¿ uh bella robinson, and myself¿ with uh john smith, uhm heading the uhm (.) <intelligent transport systems portfolio¿ (.) this thing finds its home in¿> uh mark collins ( ) and also °( ).°
°okay.°
Aud: ( ) and noc rin.
Pres: and noc rin. from uhm [(.) °from the [rta.° [
Action: [hand towards mouse [presses mouse
[new image on screen

Pres: (2.5) ((looks at screen))
—> t! **okay. so what is uh titram?** ↑uhm¿ it's a traffic simulation system.↓ so: what that means is that uhm¿ (2.0) we've set it up so that it uhm mimics the behaviour, of uhm ca::rs moving on the road. uhm (.) at various levels of fidelity. uh both on a micro and on a macro level. now the micro level¿ uhm¿ is a very clo::se, or <what we hope is> a very clo:se approximation. of what real cars do on the road.....

In this case, Phil has just finished his introduction and is about to start the main part of the talk by asking the rhetorical question, *what is uh titram?* Once again the function of *okay* does not interfere with the function of *so*. The rhetorical question is asked, just as if *okay* were not present.

Finally, an example from Mark shows how *so* orients the audience to the overhead screen (Example 13).

Example 13
(Ma:15)

.... by saying well ((points to OHP)) »a group is something with (.) the signature of a multiplicative group with an inverse¿ and it's also a monoloid¿ that has an inverse. and this is
(1) —> what a monoloid is. and °so on. and so on.° and so they all sort of uh sort of °chain together.°

(6.5) ((takes slide off, puts on pile and puts new slide on OHP. title: "Naturals"))
(2) —> khh:: ↑**OKAY. SO HERE'S ANOTHER EXAMPLE¿** and this is a sort of constructive theory¿↓ rather than <those which were sort of defining properties.> this one says it's a particular set we might be interested in¿ which is uhm .h the natural numbers¿ .....

The end of the previous section is indicated by quieter and faster talk and by the falling intonation (arrow 1). This is followed by a 6.5 second pause during which the old slide is taken off and a new one put on the projector. The presenter then clears his throat. This is followed by a louder, raised pitch $okay_2$, said with falling intonation (arrow 2), immediately followed by *so* and then the orientation *HERE'S ANOTHER EXAMPLE¿* (arrow 2). The audience has a very clear picture of what is going on. The previous section is closed off, the pause is closed off, a new image is placed on the screen, the orientation is given. Following all these signals they are ready for the start of the next topic.

The above examples (Examples 10-13) demonstrate how *okay* and *so* retain their function even in the presence of the other marker. Therefore *okay so* does not function as a single discourse marker. When the two markers occur as a composite, they retain their individual functions. The above examples also confirm the previous analysis of the individual markers, *okay* and *so*. At the beginning of a section, *so* never occurs before *okay*. This is in keeping with their individual functions. The closing down function and the indication of readiness to start a new topic, marked by $okay_2$ occurs before the orientation of the new topic, marked by *so*. *Okay* is said with falling intonation, marking the closing off of the previous part. *So* is said with continuing intonation, indicating that the orientation will follow immediately. The old slide is taken off before *okay* is said, and the new slide is placed on the overhead by the end of the orientation. In addition, *so* is never said more quietly than *okay*. Once the presenter has indicated the beginning of the new section by louder, more prominent talk, the *so + orientation* continues with the same prominence.

It is clear that when the two discourse markers occur in combination at the beginning of a section, they are a powerful device for indicating the macrostructure to the listening audience. Analysis of the data indicates that the composite *okay so*, plays an important organising role in the overall structure of the seminar, and is used by presenters to emphasise the main points of the talk.

3.4 *So* in the middle of a section

The discourse marker, *so*, is different to *okay* (Chapter 2) and also to *uhm* (as will be seen in Chapter 4) in that it is position sensitive. This means that depending upon where it occurs within the seminar, or more specifically, within a section, its function varies. Whereas at the beginning of a section *so* plays an orientation role, in the middle of a section, it functions differently. In this position, it is used parenthetically either to mark the fact that an explanation or an example is about to follow, or that the presenter is referring to something on the overhead screen.

The following example shows two instances of the explanatory function of *so* (Example 14).

Example 14
(Ph:12)

(3.0) ((looks at screen))
.h okay. the other thing that's been uhm occupying us¿ is uhm validation¿ uhm¿ (2.5) in uhm hong kong. uh we've been we've been able to get some uh real data from a street network in hong kong. uhm where scats was uhm recently commissioned¿ uh the hong kong government wanted to be sure that scats would actually improve¿ or <do something to the improve> the traffic. so they conducted a a series of tests¿ where they controlled it with a fixed time system¿ uh one day¿ and then uh the scats of that did control the system the next. uhm and measured uh the improvement. or otherwise. uh that the scats made. uhm¿ (4.5) ((looks at screen)) two of the uhm ((vaguely points at screen)) the uh uh statistics that they gathered there¿ was the start
(1) —> ((points to screen)) of green cue, **so that is, as the light goes green¿ count up what uhm how many ca:rs were stopped at the traffic light¿** and also they took a uhm uhm an equipped vehicle¿ uhm through the through the centre of the city. and and <measured the actual travel time.> (.) t! we've ((points to screen)) also been comparing it to uhm a package called cidra¿ this is uhm produced by the australian road research board. uhm¿ (2.5) it's a s-single intersection analytical model. uh it's based purely on uh equations and uh probabilities. and all
(2) —> that kind of stuff, and it only does a single intersection. **so that means, if there's any effect from a from an intersection down stream¿ uh so that cars, for instance taking off from this one¿ <can't take off at their maximum speed¿ because there's cars banked up¿ in front of the other one¿> uhm cidra doesn't capture that.** though it does capture uh the uhm (.) the local effects °very well.°
(1.5) ((presses mouse - new image))
(5.0)

It is clear that in this example, the function of *so* within the section is quite different to the function of *so* at the beginning of a section. Within a section, *so* can be used to introduce an explanation. The first arrow shows how *so* introduces the explanation of what it means to gather statistics at the start of the green cue. The second arrow shows how *so* introduces the explanation of what it means to say that 'cidra' only deals with a single intersection. One of the features of discourse markers is that they are optional lexical items. In these examples they are functioning as discourse markers and could be ommitted without affecting the information content of the following proposition. However, their presence provides a cue to the audience as to the nature of the following statement. Within a section, *so* indicates to the audience that the presenter is temporarily stepping out of the talk into a related activity, in this case, that of giving an explanation.

The following example further illustrates the way in which *so* is used to mark an explanation (Example 15).

Example 15
(Ph:4)

.....h uhm¿ (2.5) ((holds hand out)) there's going to be a little bit of extra traffic around perhaps, in the year 2000 in sydney. uhm¿ ((holds hand out)) ((laughter)) <associated with the olympics.> uhm¿ where uh uhm the model uh where that uh the (.) uh the <impact of that traffic.> uhm is <another possibility.> °uhm <for using tritram.>°

(1.5)
.h ↑another ((counts on fingers)) area that we're uh actively persuing,↓ is uhm bus priority.
—> **so this is where you uhm¿** ↓actually <<i'm going to talk about that a bit later,>>↑ but **uhm it's where you try and give priority as a at a set of signals.** uhm to public transport. °at various times.° (1.0) uhm¿ as i mentioned, ((looks at screen)) scats is currently being uhm redeveloped, or uhm brought to a a new version¿ uhm¿ (1.5) ((looks at screen)) and ((vaguely points)) we've got a place uhm helping to test that. before it ↓<actually goes out on the streets.> °uhm we'll be doing some uh bench testing¿°↑.....

At the beginning of this section, there is an orientation statement of what is going to be talked about in the next section, *another area that we're uh actively persuing, is uhm bus priority.* Following this is an explanation of what bus priority means, *so this is where you try and give priority at a set of signals to public* transport (arrow). In this example, *so* is marking the fact that an explanation of what it means to give bus priority will follow. Once again, *so* is marking the parenthetical nature of the following proposition, before the presenter reverts to the topic of the section.

It is important to clearly differentiate *so* as discourse marker from *so* in its syntactic, resultative sense. The syntactic *so* can occur in any position throughout the seminar[5], although it most frequently occurs in this median position, within a section. In the above two examples where *so* is functioning as discourse marker, (Example 14 and 15) its omission would not affect the information content of the following proposition. This is not the case when *so* functions in its resultative sense, as the following example demonstrates (Example 16).

Example 16
(Mi:8)

(2.0) ((new image))
okay. WHAT'S GOING ON. (2.5) WELL¿ UHM¿ the water is: ↑pushed out of the the bottle¿ due to the pressure difference. there's a high pressure inside the bottle¿ an there's ord ordinary atmospheric pressure outside. and as the water comes out¿ this results in a force on the rocket.↓ uhm which is uh newton's second law. conservation of linear momentum. ↑as the water comes out of the bottle¿ the mass and the (.) thus the volume of water in the bottle, is decreasing.
—> which means the volume available for gas inside the bottle, is increasing. **so the gas pressure is reducing.**↓ (2.5) everyone followed that bit? °okay?° »now unfortunately the gas temperature is also going down, which is an added complication, uhm¿ and i¿ ↓ <haven't had a chance to deal with that bit yet¿>↑.....

[5] There are a few instances of *so* at the beginning of a section being used in its resultative sense and a few at the end of a section, but these are in the minority. Generally speaking, the syntactic *so* occurs within a section.

In this example the sentence, *so the gas pressure is reducing,* results from the information given previously (arrow). Its omission would affect the truth of the following proposition. This function of *so* is quite common within a section, and is important in enabling the talk to progress. As each part is talked about it provides the basis for moving on to the next part. This moving-on aspect of *so*, which is due to its resultative function, is useful in seminar talk to keep the talk moving towards its ultimate conclusion.

Similarly, Example 17 shows how *so* can be used syntactically in recounting a story.

Example 17
(Ph:14)

.....now, ↑the first car¿ when it reaches this slight rise in the road¿↓ if the uhm if the driver isn't being incredibly uhm observent¿ he's going to slow down ever so slightly. hh as it hits this
(1) —> uhm (.) rise. and and **so the car behind it**, over a little bit of time, you might not notice,
(2) —> gets a little bit closer than it wants to be. and **so it slows down a little bit too.** the car behind it, slows down a little bit faster than the car in front. and then the car behind that a little bit faster. hh ((laughter)) uhm¿ (1.5) there's there's they noticed an exponential progression hh
(3) —> down ((laughter)) down the uhm down this platoon. **so that car number one hundred and fifty-three¿ had to take emergency braking action.** ((laughter)) car number one hundred and fifty-four came up its bumb. ((laughter)) in fact there was a three car uh collision.
(4) —> and and uh (.) and the <traffic broke down.> no sorry¿ <the flow broke down.> ↓uhm **so that everybody crawled past for next uhm you know half a day.** until uhm everything was was °cleared away.°↑ uhm¿ (3.0) yeah. it's it's that kind of thing that uhm you know (3.0)

Here Paul is describing how there is an exponential progression down a platoon of cars, such that the distance between the cars becomes progressively smaller. Because the first car slows as it goes over the rise, the second car gets a little bit closer to the car in front (arrow 1) and therefore it slows down too (arrow 2). Because the distance becomes shorter and shorter, eventually one car crashes into the one in front (arrow 3). As a result, everybody crawled past for half a day (arrow 4). *So* is used to move the story along, by indicating what occurs as a result of what has happened previously.

The syntactic *so* is therefore functioning quite differently from the discourse marker *so.* As discourse marker within a section, *so* indicates that the presenter is temporarily moving out of the topic of the section. We saw how this occurs when an explanation is given. It can also occur when the presenter wishes to highlight something on the overhead screen (Example 18).

Example 18
(Mi:11)

(2.0)
↑no:w. (1.0) the other thing that's going on, is that we know that the rate of change of volume of the gas, is equal to minus the rate of change of volume of the water.↓ <because the volume of

the system is constant.> as the water goes out, the gas has more space to expand into.
(1) —>**so that's this one up here¿** that says (.) ((walks over to screen)) °sorry i need a pointer¿° this one ((points to screen)) here¿ that the rate of change of the gas volume¿ is negative the rate of change of the water volume. ↑but we know that the change of volume of water¿ ((points to screen)) is the vol-(.) the velocity ((points to screen)) that the water goes out of the nozzle¿ times the area of the nozzle.↓ this is uhm meters square¿ <<this ((points to screen)) is meters uhm per
(2) —> second. and this is meters squared. **so we end up with meters cubed per second.**>>....

In this example, *so* is used as a marker to highlight something on the overhead, ***so that's this one up here¿*** (arrow 1) The presenter wants to use the image on the screen to illustrate a point. As is clear from the extract, he actually points to the screen, after saying *sorry i need a pointer¿* This contrasts with the second example of *so* (arrow 2) where it is being used in its resultative sense *so we end up with meters cubed per second.*

The following example shows again how the presenter uses *so* to highlight something on the screen (Example 19).

Example 19
(Ma:3)

(5.0) ((taking off slide, putting onto pile and putting new slide on OHP. title: "terminology"))
.h ↑SO SOME OF THE:: (1.0) uh TERMINOLOGY (1.0) that .h i'm going to be relying heavily o:n¿ (.) uh for this talk¿ first of all, uh the notion of a space, uhm¿ which you can really just think of as a set¿ <so it's all just back down to set theory.> but a space is a set. which i'm using to mean a set with some interesting structure to it. ↓ <°which we don't really know what that structure is at the moment.°> °but it can depend on the space of course¿° ↑.h uhm¿ and so being a set¿ uh it has elements¿ ((points to OHP)) uh in it¿ i'm using this made-up word
—> metaspace, to talk about uh spaces↓ which (.) whose elements are spaces. **so** ((starts to move over to 2nd OHP)) **over on this model here¿** ((points to diagram)) i've got this rather fancily called universal information metaspace¿ well that's a big space. and it's elements are spaces. and then the °elements of those spaces are are just uh elements.°
(2.0) ((moves back to 1st OHP))

In this example, Mark is talking about the terminology in his model. He talks about *spaces* and *sets* and a made-up term, *metaspace*. He then directs the audience to the overhead by saying, *so over on this model here¿* Again, the presenter actually points to the screen at the end of this phrase, which seems to be a requirement with this function of *so* (Figure 2).

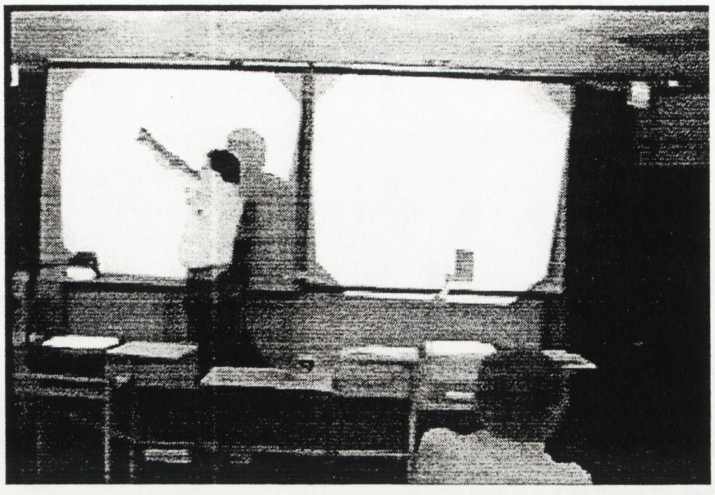

Figure 2: *....so over on this model here¿ i've got this rather fancily called universal information metaspace¿...*

The third way in which the discourse marker *so* can function within a section is to mark the fact that an example or a hypothetical situation will follow (Example 20).

Example 20
(Ph:11)

(2.5) ((looks at screen))
.h uhm¿ (0.8) we've ((vaguely points)) also been working on close (renegotiation) of of uhm the scats, uhm (.) system¿ uhm¿ part of the uhm the intellegence that's in the scats box, that's sitting down in sydney¿ is is what's called the the local controller. and this is the uhm this the logic that determines uhm things like uhm¿ if there's no cars passed the detector for three seconds¿ uhm¿ the controller will uhm on it's own¿ without talking to the central computer¿ will say okay. i don't need to show green for that direction any more. <it cuts off that green, and goes onto it's °next stage.°> uhm¿ and it scoops up all of the s:: uh time that it can, and gives
—> that to what it's been told is the most important direction. ↓**so if you've got a main arterial road, and a cross road it'll save as much time as it can on the cross road and °<give it all to the main main road.>°↑** so we've got the crode ((points to screen)) the code that emulates that logic, and we're put <we're in the middle of putting that into> uh (2.0) °tritram.°
(1.5)

In this example, *so* is used to introduce the hypothetical situation of managing the traffic when a main road intersects with a cross road (arrow). It is when the presenter gives a hypothetical situation or an example that it is possible to see most clearly how *so* has the function of marking something in parentheses. The hypothetical situation in Example 20 is bracketed from the rest of the talk in the section by being said with lower pitch. In this way it is set aside from the rest of the talk.

Bracketing can also be achieved by reduced volume or by faster talk as in the following example (Example 21).

Example 21
(Ph:8)

(4.0)
uhm¿ (1.0)
OKAY. NOW, (1.0) YOU CAN UHM INVERT (.) uhm (.) this this graph, to end up with uhm ((presses mouse - new image)) something kind of interesting. and that is, uhm¿ by looking at how uhm the time between cars. so that was the distance between cars, now if we divide that distance, by the the speed that the car is doing, uhm we can work out <for a person standing on the side of the road¿> how long does it uhm take between for those cars, (.) uhm between cars
—> passing you. uhm¿ and **<so if the cars are going very slowly, it takes a very long time¿>** and you can see that the cars pass you uhm at an increasing rate when you're up high¿ an increasing rate when you're low, and there's a minimum around about here. and this is a rea::lly interesting minimum.....

In this case, *so* introduces the hypothetical situation of what happens if the cars are going very slowly, *so if the cars are going very slowly, it takes a very long time¿* (arrow). Saying the example more quickly than surrounding talk emphasizes the fact that the presenter is temporarily stepping out of the talk into a related activity. This temporary stepping out is marked by *so*.

In this next extract, the example is again said faster than the surrounding talk (Example 22).

Example 22
(Ph:16)

(19.5)
((takes slide off OHP; turns OHP off; walks back to computer; presses mouse - new image))
t! okay. ((looks at screen and continues to do so)) and uhm¿ (2.5) this is the uhm the comparison with the uhm the cidra uh data, uhm¿ (4.0) ((looks at screen)) °actually uhm° ↓ i wanted to finish off soon. ((new image)) there's a couple of ones that i wanted to talk about. uhm¿ (2.0) there is the last ((new image)) one. uhm ↑ queue was kind of interesting, uhm¿ (3.5) for uhm (.) there's (.) some (.) reasonably big differences here. uh the the thing to remember
—> though is uh that this is queue in meters. so a car uhm is is accounts f-for six meters. **<so for instance on this one here, uhm at the approach to two hundred, uhm uhm we predicted six meters,>** uhm cidra said uh nothing at a:ll. uhm¿ basically there's there's, for all intents and purposes, that's that's sufficient accuracy. uhm¿ it means that uhm (.) uhm (.) °yeah.° (.) if you're going to uh build uhm uh for instance a lane to to if that's a a right hand turn lane¿ then you've got a °fairly good idea of how long tha- uh that lane should be.° there was a couple, uh one here, one hundred fou::r, which °i'll show you uhm (.) a picture of.°
(8.5) ((walks over to OHP; picks up slide and walks to computer image to check slide against it))

In this case, *so* introduces the example of what happens at the approach to node two hundred, *so for instance on this one here, at the approach to two hundred, we predicted six meters.* Once again it is put in parentheses by being said more quickly than the surrounding talk.

The preceding examples (Examples 14,15, 18-22) have demonstrated the function of *so* as discourse marker within a section. They contrast with how *so* functions in its syntactic

sense (Examples 16 and 17). As discourse marker, *so* marks the fact that the following bit of talk should be seen as being parenthetical to the main idea(s) of the section. The parenthetical talk may be an explanation of something, it may refer the audience to the overhead screen or it may be an example. Prosody can be used to bracket such parenthetical talk from the main body of talk. In these examples, as in all examples of discourse markers, the markers can be ommitted from the talk. Such ommission may make interpretation of the subsequent talk more difficult, but it will not affect the information content of subsequent propositions.

3.5 *So* at the end of a section

At the end of a section, *so* functions differently yet again. In this position, it marks a resolution of an idea or concept, as illustrated by the following example (Example 23).

Example 23
(Ar:2)

(1.5)
U:HM::¿ (1.0) ((moves slide up)) NOW. i've just got an example here¿ of a particularly useful application of wavelets¿ °uhm° which is the saw-tooth wave¿ (.) uhm the wave looks like this¿ (9.0) ((draws on board)) uhm¿ and if you sample that at a rate of °uhm° (.) 256 uh samples per second¿ (.) uhm¿ then you will in fact need uhm 256 coefficients in your frame expanse to represent it. uhm¿ the wavelet that you get is in fact only sixteen ( )¿ which is the
(1) —> right wavlength¿ ((takes slide off)) °**so it's a lot more more efficient.**° ((puts slide on pile))

(2.0) ((picks up new slide))
UHM¿ (1.5) ((puts new slide on OHP)) THE OTHER ISSUE is speed. wavelet transforms uhm can be computed in order n cycles¿ UHM¿ this- most transformers are computed in n squared¿ or n squared cycles¿ and even the n squared transform uhm is order n log n. so in fact this is uhm quite good¿ uh what multiple you've got before that n¿ °uhm° <depends on the wavelet¿>
(2) —> **°so a complex uhm wavelet¿ will in fact require an order of something big times n¿°**
(1.5)

This example shows how *so* is used to mark the end of a section. The example shows two short sections, both of which start following a pause and with *uhm* said a bit louder than preceding talk. At the end of each section, Andrew concludes the section by pulling it all together in a final comment, which is said a bit softer than the preceding talk. This final quieter comment, preceded by *so*, indicates to the audience that the section is about to finish.

There are two main sorts of resolutions at the end of a section. Either the presenter gives a summary of some sort, giving the 'gist' of what has been said in the previous section, as at arrow 2 in the above example (Example 23), or the presenter gives a metalevel resolution, by giving an assessment, as at arrow 1 in the above example (Example 23). Resolutions

generally follow a pattern. They are marked by *so*, they are near the end of the section, they are generally said with quieter, faster talk, and they are followed by a pause. The old slide is either taken off during the resolution or during the pause, prior to the commencement of the new section.

The first type of resolution (arrow 2) resembles Heritage's (1985) notion of formulations which occur in news interviews and courtroom talk. Formulations focus on aspects of prior talk by summarising the gist of what has been said and are typically marked by *so* or *well* (Watson, 1990: 283). They are used by news interviewers and in courtroom talk in order to develop and advance the narrative in a neutral way. Heritage notes that formulations are common in audience directed institutional talk (Heritage, 1985: 100). In new interviews, formulations are used by interviewers instead of news receipts and assessments. By re-presenting the knowledge and experience of the interviewee as a formulation, the interviewer forces the interviewee to comment on the formulation, thus stretching the discussion of the topic over a further turn. In seminar talk, however, formulations play a different role. They resemble the way in which topics can be closed off in conversation (Button 1990). The formulation plays a closing down function, enabling the presenter to move onto a new idea, as can be demonstrated in the following example (Example 24).

Example 24
(Ph: 5)

↑uhm¿ ((vaguely points)) and there's also↓ uhm uh s::cats itself doesn't have much in the way of validating it's own data. uhm¿ so thing-uh i mean a simple case is, you've got two sets of lights, a hundred meters apart¿ uhm if you give the setting, which will,↑every single time a car leaves from there it will get a red light. uhm¿ exactly at the wrong moment↓<when it gets there.> scats is quite happy to do that. uh and ↓actually has no way of telling that it's doing
—> that.↑ uhm¿ ((points at screen)) »**so one way** ((points at screen)) **of using tritram, is to run** ((circles arms)) **through these things and and and light** ((points finger)) **some flags to say, i think** ((points at screen)) **this is not °quite right.°**
(2.0)
((presses mouse - new image))
(2.5)

t! okay. h so that's (.) ((pushes both hands away in direction of the screen)) why you'd want to do uhm the system¿ uhm¿ (1.0) i'll dive down into a a bit of the guts of the system, how how it works. (2.0) ↑i mentioned before that it's got uh these two↓ uhm different models of vehicle motion, that uh that co-operate together.....

This example shows how the section is resolved by the formulation, *so one way of using tritram, is.....* The formulation, marked by *so*, closes the section off by giving the gist of what the section was about. The presenter's talk becomes gradually softer and faster, as

marked by »,[6] and ends with falling intonation and quieter talk. The resolution is followed by a 4.5 second pause, before the next section is commenced.

Another example of a formulation is illustrated by Example 25.

Example 25
(Ma:14)

(2.0) ((takes slide off))
uh ((puts on pile))
(1.5) and then we can go on ((puts new slide onto OHP. title: "Groups")) to define higher level structures (2.5) uhm (2.0) t! like groups and so on, by saying well ((points to OHP)) »a group is something with (.) the signature of a multiplicative group with an inverse¿ and it's also a monoloid¿ that has an inverse. and this is what a monoloid is. and °so on. and so on.° ((moves
—> back to OHP)) and **so they all sort of uh sort of °chain together.°**

(6.5) ((taking slide off, putting on pile and putting new slide on OHP. title: "Naturals"))
khh:: ↑OKAY. SO HERE'S ANOTHER EXAMPLE¿ and this is a sort of constructive theory¿↓ rather than <those which were sort of defining properties.> this one says it's a particular set we might be interested in¿ which is uhm .h the natural numbers¿ uh which are in this case generated by the constant (.) well defined by the constant .....

The presenter is talking about groups, which are higher level structures, and concludes by saying *so they're sort of all uh sort of chained together.* Even though the section is quite short, the change in the speed and volume of the voice is evident, with the final part of the formulation being said more quietly than the preceding talk.

Finishing a section with a formulation, by giving a summary of the gist of the topic, is one way to resolve an idea. However, the topic of the section can also be resolved at a metalevel by relating to the topic of the section as a whole (Example 26). This type of resolution is also marked by *so.*

Example 26
(Ph:8)

..... and this actually answers one of the questions that i pose in in my abstract. why is it that uhm¿ (.) <<°i think i pose this in my abstract,°>> why is it whenever you're coming up to a uhm to a set of traffic lights, they always wait till you uh (.) well stop. before they before the lights go green, ↑why is that¿ why can't they just go green ↓ and let you go straight through. and the answer is they don't want you to go straight through. if you go straight through at sixty kilometers an hour, there's actually, you're wasting time. in the intersection. they actually want ((points with finger)) you to slow down. ((laughter)) so that on average »the people going through, are going through at °forty kilometers ((horizontal movement of hands)) an hour.°
—> **so** (1.0) ((pushes left hand away)) **that's** ((raises and lowers left hand)) **kind °of interesting.°**
(2.5)
((presses mouse - new image))

[6] At the end of a section, speakers gradually make their voice phonologically less prominent, by speaking more quietly and faster than the rest of the section. As no transcription convention existed to mark this change, I have chosen to indicate it by ».

(2.0) ((cough)) (0.8)

okay. so uhm¿ (1.5) that's:: (1.5) the the reason why we've been doing, or the reason that <<i've been doing is is all been on this uh this uhm>> vehicle uhm the car-following model. .....

In this section Paul is discussing why cars have to slow down at intersections. He resolves the topic by giving a personal comment *so, that's kind of interesting.* In saying this he is giving his perspective on the work he has been doing, and he accompanies it with a quite distinctive hand movement (Figure 3). He raises and lowers his left hand into the air and moves his head to one side. Presenters tend to accompany assessments with some sort of hand movement.

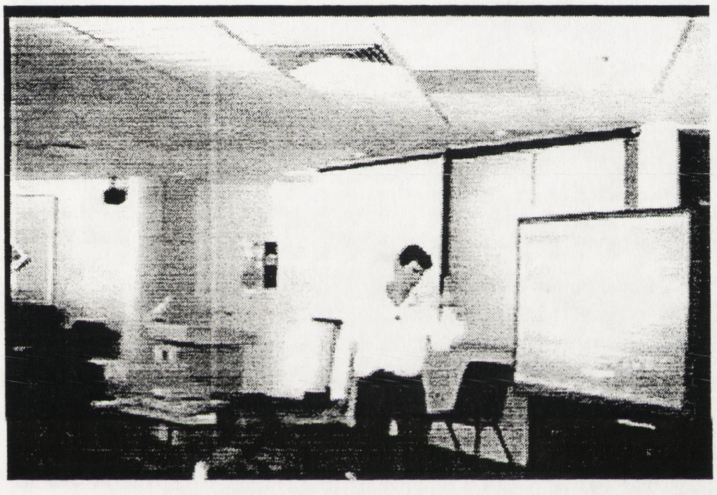

Figure 3: *...so (1.0) that's kind °of interesting.°*

Schiffrin (1987) discusses how the discourse marker *so* can mark different levels of discourse, either locally or globally. *So* is used in a local sense when the discourse it marks has a narrow scope whereas it is used in a global sense when the discourse it marks has a wide sense. Resolutions in seminars, marked by *so*, would seem to fit in with this characterisation. *So* either marks a local resolution, in the form of a formulation (Example 24 and 25), by pulling the preceding section together as a kind of a summary or generalisation of what has gone on. Alternatively, *so* marks a global resolution (Example 26), with the presenter referring to the topic on a metalevel.

Global resolutions resemble the pre-closing phase of a conversation (Schegloff and Sacks 1973, Button 1990, 1991). Assessments, for example, are used in the pre-closing phase of a conversation to indicate a speaker's readiness to close the topic being discussed. When there is no further talk on a topic, it is said to be bounded. Topic bounding generally only occurs at the end of a conversation when a speaker indicates his/her readiness to close a

conversation, by giving, for example, an assessment or announcing an arrangement. In seminar talk, as in conversation, resolutions are topic bounding, as indicated by faster and quieter talk, falling intonation, an extended pause and the change of overhead slides. However in seminar talk, the speaker always produces a new topic, the next section. The fact that discussion of a topic commences and is closed off before a new topic is commenced is quite different to conversation where, prior to the pre-closing environment, topics generally merge into each other (Schegloff and Sacks, 1973).

The following example illustrates again how the presenter uses an assessment to achieve a global resolution (Example 27).

Example 27
(Ma:23)

(2.0)
(1) —> ↑uhm¿ (2.0) and the question that's most often asked¿ is↓ (1.0) alright. so i have this particular piece of data¿ what's the best display ((takes slide off)) for it.

(1.0) ((puts onto pile))
uhm¿ (1.5) t! well in fact that's ((puts new slide onto OHP. title: "The Display Problem")) a pretty hard problem (2.0) uh to ask¿ and to answer in general¿ uhm¿ ↑because the display problem, is actually one ((points to OHP)) of finding uh all of these things¿ simultaneously that satisfy of all the constraints that you spatisfy- that you specify and↓ are consistent and °(everything).° ((points at screen)) .h so you need to find your ↑information spaces you're starting with¿ uhm¿ you need to find a different space, that's more appropriate¿ you need to find a mapping between them¿ you have to make sure you can find a scene here¿ which is iosomorphic¿ uh you also have to define a sys- find a system that can represent the data¿ for your space¿↓ and have an algorithm to produce the right scene to be rendered to produce the »structure
(2) —> of the scene ((walks to OHP)) °that you you wanted.° **so it's uhm (.) sort of difficult.**

(2.0) ((takes slide off))
↑SO HOW DOES THE UH↓ (2.5) ((puts onto pile)) how does the (.) model ((puts new slide onto OHP. title: "Algebra & search")) and the algebra help you do that¿ ↓well it sort of doesn't. actually¿ unfortunately¿↑ (1.0) uhm¿ (1.5) t! because the spaces are here, ((points to OHP)) maybe these are scene spaces, and this is the space of all algebras, ↓well the things that are sensible scenes are a long way apart, and <once you've done one they don't really tell you how to get to another °one.>↑ okay.°

In this example near the end of the talk, Mark asks the question what is the best display for a piece of data (arrow 1). He then proceeds to answer his own question, by listing the constraints that have to be satisfied in order to work out the best display. There is obviously a lot involved in working out the best display and he concludes the list by acknowledging the difficulty of the procedure, *so it's uhm (.) sort of difficult* (arrow 2). Here he is not giving a summary of the topic as in a formulation, rather he is giving his personal perspective on the topic. This example illustrates how assessments not only resolve a topic, they also allow the presenter to commit him or herself to a particular viewpoint. This contrasts with the more neutral, objective scientific descriptions generally found in scientific seminars (Goodwin 1996: 392).

A further example illustrates the distinctive hand movement found in this environment (Example 28).

Example 28
[Mi:19]

.....»uhm¿ the final thing which i didn't do, is you're supposed to have a variable step size. because uhm you <don't want to spend a lot of time calculating things when the graph is very smooth¿> you can zip ahead¿ but when it gets very rough, you want to slow down. °i didn't bother with that bit. i uhm just simply used up computer time.° uhm¿ for example¿ °the graphs
—> on there takes point one of a second or something or other. on spark two. so ((flips hands into air)) **who cares.°**

(3.0) ((new image))
↑OKAY. SO THAT'S the water thrust phase. the next bit of the rocket, is the air thrust phase. and basically i didn't bother.↓ uhm¿ i suspect i should have tried harder, but one of the difficulties is that although it's constant volume¿ the pressure is a function of time¿ and the density's a function of time. °uhm° which makes it a little bit more harder to analyse. i don't think benooly's equation applies. or certainly not in linear form. .....

In this example, Mitchell talks about the problems associated with calculating the variable step size, and concludes by saying that he did not bother with that bit. He then goes on to finish the section by giving a global resolution in the form of an assessment, *so who cares,* said with characteristic quieter talk associated with the end of a section. As he gives the assessment, he moves both arms up and down in the air. (Figure 4)

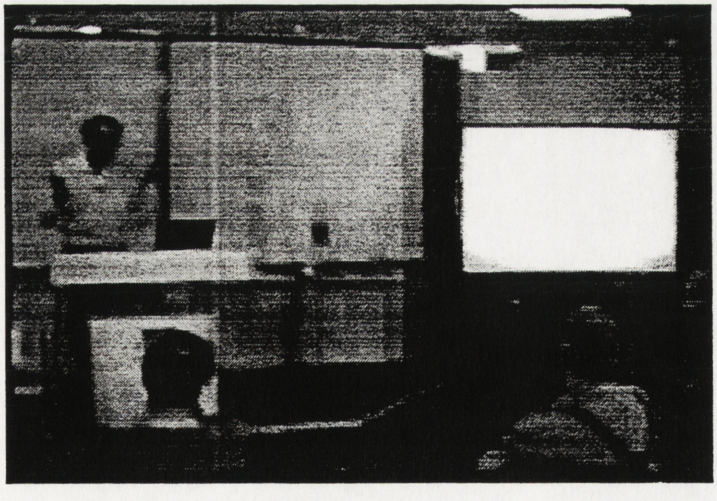

Figure 4: *..so who cares.*

Global resolutions can take a number of different forms. In the above three examples (Example 26, 27, 28) they took the form of an assessment. They can also take the form of a warrant, as in the following example (Example 29).

Example 29
(Ph:1)

((claps hands on legs)) okay. so uhm¿ (0.8) thanks for coming¿ .h this talk is turning into a mult-media nightmare. hh ((laughter)) .h uhm¿ (0.8) i've already got, as you can ↓ see¿ one¿ two boxes on the desk, that i was going to be flipping through. .h i couldn't transfer files from one system to another¿ so we've got (1.0) uhm hard copy o-h-p's as well¿ we've got- uh the whole thing is being put onto celluloid¿ uhm¿ (1.0) so and and i haven't had a chance to uhm run through the final, hh ((laugh)) run through. .hh because i've spent all morning trying to get this
—> box ((points to box)) to work. **so my apologies** ((moves head slightly)) **if it sounds a little bit °uhm¿ a little bit haywire.°**↑
(2.5)

↑oka:y. ((new image)) what i'm going to be talking about today¿ is the uh the tritram project. and this is basically just an update of uh research. u:hm¿ what we've been doing uh recently¿ uhm¿ what the system currently does¿ and u:h where it's uhm headed in the future.....

This example is taken from the beginning of the talk where Paul is talking about the technical difficulties in setting up the talk. He concludes the section with *so my apologies if it sounds a little bit haywire*(arrow).

A global resolution can take the form of an appreciation (Example 30).

Example 30
(Ma:1)

°thank you. thankyou¿° thanks everybody for coming¿ uhm¿ (.) i just want to uh (.) ((moves over to OHP)) point out at the start¿ that i uh did my slides on the csiro template uh for convenience¿ <of course this research was sponsored by access.> ((points to OHP)) very wonderfully. and of course was done under the guidance of the computer science department¿
—> ((points to OHP)) and **°so: thank you** ((claps right hand on leg)) **to all those wonderful people who helped** ((takes slide off)) **me out° there¿**

(1.0) ((holds slide in hand))
uhm¿
(2.5) ((puts slide onto pile))
t! i hope ((picks up new slide)) you weren't uh too sucked ((puts new slide on OHP. title: "scope")) in by the uh the supermodel stuff¿ that i sent out in the (.) in the abstract, uhm¿ (.) t! what i really i'm really talking about today (.) is (.) uh applying formal models, <as phil said.> applying formal models uh to information displays.....

This example is also taken from the beginning of the talk. In this case, Mark thanks the people who helped him with his project (arrow).

A global resolution can also take the form of an instruction (Example 31).

Example 31
(Mi: 25)

OKAY. (2.0) °any questions?° (2.0) oh i should've (.) while you- (.) i forgot to hand these ((picks up sherts)) out. these are some uhm (.) ((hands out sheets)) these are some frames, that I

—> took from the water coming out of the bottle. <°**so you can have a look at those.**> (1.0) ((handing out)) if you haven't already seen enough, (2.0) ((handing out)) uhm¿ they're basically all the same. it's just (.) it's probably easier to see them on the print-out.°
(4.0)

↑ALRIGHT, SO¿ THAT'S WHAT I DID TO VERIFY the design¿ and very quickly¿ what¿ does all this tell us about improving the design. well there's a couple of principles that are are quite obvious. first of all¿ higher air pressure in the bottle is always a winner.↓ .....

In this example the presenter instructs the audience to look at some pictures that he has handed out (arrow).

It can take the form of a caution (Example 32).

Example 32
(Mi:6)

↑the reason why it's sideways is, if you think about a conventional television camera, if you turn it on it's side, you get more vertical dimension in the frame¿ an' since i'm-i actually use this to make some measurements, i wanted to get the maximum vertical dimension into the frame.↓ it's a real problem with the television camera, if you get close enough to see any detail, it disappears out of frame very quickly. as you go further back, you get more of the flight in, but
(1) —> you end up with less detail. °**so** (0.8) <**it's a bit** ((moves hands back and forward)) **of a compromise**°.>

(2.0)
now what i'll do ((starts to work on computer)) now is i'll run it through frame by frame, because i want you to observe (.) ↑there are three distinct phases in the flight.↓ now unfortunately this end peg player and most of them, don't have the ability to go backwards.
(2) —> **so if you hear me mumbling under my breath¿** it's because i'm counting ((counts on finger)) when to push the button. ((works on computer))

(5.0) ((video plays))
now. <↓also you've discovered that the multimedia system on this pc's hopeless. too. the sound's now got in front of the video.> °but↑°.....

In this example, the first arrow shows a global resolution in the form of an assessment, as discussed at Examples 26, 27 and 28. Once again, the presenter accompanies the assessment with a distinctive hand movement. The second arrow shows how the presenter cautions the audience not to be concerned if they hear him mumbling.

Finally, a global resolution can take the form of a back reference, referring back to what has just been covered (Example 33).

Example 33
(Mi:13)

Pres: ..... and the bottom one ((points to screen)) is what happens with uh¿↓ (.) two and a half litres of water in the bottle. (.) uhm¿ and that looks to me like some °sort of uhm (.) exponential. (1.0) like°
Aud: what are your axis or co-ordinates ( )?=

Pres: =okay. this ((points to screen)) one here is pressure¿ in kilopascals¿ and this ((points to screen)) one over here is time¿ in essentially uhm miliseconds sorry seconds times ten to the minus three. so this is point one ((points to screen)) of a second¿ point two ((points to screen)) of a
second¿ point three ((points to screen)) of a second.

(1) —> ↑now one of the interesting things is that, for most of the rockets you'll see in the video, the water is expelled within about 40 to 50 miliseconds.↓ <that's really a very short period of time indeed.> and as you'll see later¿ this induces »quite extraordinary accelerations in the rocket. (.) of the order of ten¿ and twenty gravities. (.) which is quite outside most people's experience. uhm¿

(2) —> **so °that's** ((circles solutions on screen)) **that's the solutions there.°**

(2.0) ((walks back to computer))

Pres: °uhm° [2.0=

Action: [new image

(3) —> Pres: =↑oka::y¿ **so now we know about the behaviour of the pressure¿ in the bottle¿** (.) and we know how to turn pressure into the velocity of water. we now have to turn it into thrust. .....

In this example, an audience member wants clarification about the co-ordinates on the graph. The presenter answers the question, then comments further on an interesting aspect of the rockets (arrow 1). He then gives a global resolution, marked by *so*, in the form of a back reference to what has just been covered, *so that's that's the solutions there* (arrow 2). Once again, the resolution is said more quietly than preceeding talk and is accompanied by physical action, this time circling the solutions on the screen. Such resolutions resemble the way in which topics are closed off in conversation, when the speaker moves into a closing implicative environment (Button 1990, 1991).

A back reference at the end of a section only refers to the topic of the previous section. It differs to how *so* can refer backwards as the orientation at the beginning of a section. At the beginning of the next section (arrow 3) *so* marks the orientation which happens to also refer backwards. However, this referring backwards relates to the bigger picture, relating to what has been talked about over the last few sections, *so now we know about the behaviour of the pressure¿ in the bottle¿* This is different from the back reference at arrow (2) which only refers to what has been talked about in that section.

Resolutions at the end of a section are often marked by *so*. They can either be a formulation, whereby the gist of the topic of the section is given or they can refer to the talk on a metalevel. Metalevel or global resolutions can be in the form of assessments, appreciations, instructions, cautions, or back references. Resolutions bound the topic of the section and are generally said more quickly and quietly than surrounding talk. They are sometimes accompanied by specific hand movements. They are always followed by an extended pause, during which slides are changed, prior to the commencement of the following section.

3.6 Different functions of *so* within one section of talk

So is an important word in seminar talk, occuring frequently throughout the talk. Its position-sensitive nature means that within any one section of talk, there may be up to 5 or 6 instances of *so*, all playing different functions, depending on their position in the section. The following example shows how a number of *so's* can occur in close proximity to each other (Example 34).

Example 34
(Mi:9)

	Pres:	(2.5) everyone followed that bit? °okay?° »now unfortunately the gas temperature is also going down, which is an added complication, uhm¿ and i¿ ↓ <haven't had a chance to deal with that bit yet¿>↑ we'll see that later [on.
	Aud:	[°use hot water?°=
	Pres:	=sorry?
	Aud:	use hot water?
	Pres:	hh hh ((laughs)) okay. uhm¿ (2.0) now the force that's caused by the water being shot out the end, has to overcome gravity¿ which is the weight of the rocket¿ and it has to overcome the aerodynamic drag. now <initially the aerodynamic drag is zero, because the rocket's not moving,> but as it speeds up, the <aerodynamic drag becomes quite substantial.> ↓in fact uhm four or five times the force exerted by gravity.↑ (2.0) uhm¿
(1) —>		**so the s surplus force <after we've taken all that into account, is used to accelerate the rocket.>** now ↑initially the rocket↓ is very heavy. <because it's got all this water in it.>
(2) —>		**↑so::, (.) it accelerates slowly.** but¿ as↓ the water is pushed out the end the mass of the rocket is getting less and less,
(3) —>		**so::, uhm the uh the acceleration, sorry. <the weight of the rocket is falling, and the gravity force drops.>**
(4) —>		**↑<so it's quite an interesting little system of things going up and down.>↓** (.) uhm¿
(5) —>		**so that's the water thrust phase.**
		(3.0) ((new image))
(6) —>		**t! ↑SO. STARTING RIGHT at the very beginning, we need to answer the question¿ how fast does the water come out of the bottle.↓** now mr benooly¿ back in 1738¿ ↓just to make you feel good that he (.) was a pretty clever sort of fellow¿↑ he developed a thing called benooly's equation¿ which describes the ↑steady state flow of a non-viscous incompressible fluid.↓ and <by and large that describes water.>.....

This example shows 6 instances of *so* in close proximity, yet with different functions. Initially (arrow 1), it is used to mark the fact that the presenter is temporarily moving out of the main body of the talk to explain how the surplus force accelerates the rocket. At arrow 2 and 3, *so* is not being used as a discourse marker, it is being used in its resultative sense. At arrow 4, at the end of the section, *so* introduces a global resolution in the form of an assessment. This is said a little faster, as is often the case for resolutions, yet unusually for the end of a section, it is said with raised pitch. This resolution (arrow 4) is then followed by another resolution in the form of a back reference (arrow 5). This is followed by a 3

second pause, during which the presenter clicks on the mouse to put a new image on the screen. That section is finally closed.

At arrow 6, the presenter moves onto the new point. He is about to commence the theoretical part of his talk. He starts off with a dental click followed by *SO* said with a louder, raised pitch voice and with falling intonation. This is slightly different in that normally *so* would connect straight into the following phrase with no obvious intonation pattern. The falling intonation could be related to the closing off of the previous section of talk and indicating that the new section is about to commence. This role would usually be indicated by an *okay*$_2$. Alternatively, he is using *so* with falling intonation to emphasize that he is about to begin the major section of his talk, having just finished showing the video of the rocket launch. Such an interpretation fits in with what he says next: *STARTING RIGHT at the very beginning* before he asks the rhetorical question, *how fast does the water come out of the bottle.* In this way, he firmly orients the audience, by telling them that they are going to start at the beginning. The fun video part of the presentation is over and the theoretical part is about to begin.

Example 34 is not an isolated example. The following example (Example 35) demonstrates again how the different functions of *so* can work together.

Example 35
(Ma:1)

..... providing some formal basis for this for these things, is a way of uh it's not it's not the ultimate solution to everything, °it's just uh one °you know° step in providing better ((starts to take slide off)) interaction.°

(1.0)
uhm¿ (2.0) ((puts on pile))
(1) —> t! **so** ((picks up new slide)) **what is an information** ((puts new slide on OHP. title: "information display")) **display?** well i spent about half an hour at my confirmation
(2) —> seminar talking about that¿ **so i'm not going to uh not going to repeat that¿** uhm the important facets are that they it's ↑a way of taking some data¿ ((looks at OHP)) t!h mapping it into a perceptual representation¿ that can be then used by a human user¿ to uh perform some task.↓ uh °based on that data.° uh (.) all of the hh (.) displays that we'll look at today are primarily visual displays¿ »but of course as you know there's work going on in this building as we speak on auditory displays¿ and olphatic displays¿ and immersive displays¿ and <all those sorts of things.>
(3) —> **so hopefully these results will will generalise to those areas.**

(2.5) ((takes slide off))
(4) —> ↑**OKAY.** ((puts onto pile)) **SO**↓ (2.0) **without any** ((walks over to 2nd OHP)) **mo::re** (1.5) .h **introduction,** ((turns 2nd OHP on with new slide in place)) **i'm going to (.) put up the super model¿** (2.0) t!h uhm¿ .h (1.0) ((coughs)) (.) which is quite a complex thing¿↑i've called it a super model because (.) i wanted to .....

In this example, there are 3 instances of *so* within one section of talk (arrows 1-3). The first arrow indicates how *so* is used at the beginning of a new section to orient the audience

as to the next topic by way of a rhetorical question. The slide is in place by the end of the question. The question is then followed by the answer, marked by *well*, which forms the basis of the topic of the section. At arrow 2, *so* is being used in its resultative sense. Because the presenter spent half an hour talking about information displays at his confirmation lecture, he is not going to repeat it. At arrow 3, *so* is used to mark a global resolution in the form of an assessment.

Arrow 4 shows how the next section begins with *OKAY. SO, without any mo::re introduction, i'm going to (.) put up the super model¿ which is quite a complex thing¿* The composite *okay so* is marking one of the major points of Mark's seminar. He has just finished the introduction and is about to move onto the main part of his talk. Although occurring together, *okay* and *so* are functioning separately, with *okay* playing the double role of closing off and indicating readiness to start the next part, and *so* playing the orientation role. There is a 2.5 second pause, during which the old slide is put on a pile. The presenter then says *okay* with falling intonation, immediately followed by *so*. Both markers are said with raised pitch, indicating their association with the start of the new section. There is a two second pause and then the orientation is given. During this orientation, the presenter walks over to a second overhead projector. This second projector, with the slide in place, is turned on near the end of the orientation. Only after everything is in place, and the audience has been told what the new section is about, is the presenter ready to begin the new topic.

3.7 Conclusion

Discourse markers play and important role in seminar talk, by indicating to the listening audience how the following talk should be interpreted. The above analysis has demonstrated that the discourse marker *so* has a number of different functions, depending upon where it is situated within the talk. Its position-sensitive nature enables it to indicate both where a section commences and where it finishes, with *so* marking the orientation at the beginning of the section, as well as the resolution at the end of the section. In addition, it indicates when the presenter is temporarily stepping out of the main body of talk to give an explantion, an example, or to point to something on the overhead screen.

Sections have a definite beginning, middle and end. The boundary between sections is full of indicators as to what is going on. At the end of a section, there is a resolution with falling intonation, the voice becomes quieter, and slides are taken off. The resolution is often marked by *so*. This is followed by a pause. Sometimes a quieter *okay* is said at this point. A new slide is picked up, and the new section commences in a louder or raised pitch

voice. The beginning is often marked by *okay* or *so,* or the combination, *okay so.* An orientation is given and then the slide is projected onto the screen in time for the start of the new topic. The audience therefore knows that the previous topic has been closed off, the pause has been closed off, a new image is on the screen, the orientation has been given and that a new topic is about to begin.

The precision with which everything occurs at the boundary enables the audience to have a clear picture of the structure of the talk. This is evidenced by the fact that audience members generally choose to interrupt at the boundary, and not within a section (Example 36).

Example 36
[Ma: 5]

(5.5) ((taking off slide and putting onto pile))
Pres: kh:: ↑OKAY. ((picks up new slide)) but I'D LIKE TO TALK MORE ((puts new slide on OHP. title: "conceptual level")) ABOUT THE UHM (2.5) THE CONCEPTUAL level of information display. and that's really trying to look at what's happening here, ((walks over to 2nd OHP)) uhm but from the users point of view.↓ ((ponts to diagram on 2nd OHP)) from the point of view of the of the human viewer. so ((walks back to 1st OHP)) we define uhm¿ (.) t! information spaces which are sort of analogous to data spaces, except that it's the information, as percieved and understood by the person viewing the display, and using it for their task¿ (.) uhm¿ t! and scene spaces, ((points to OHP)) which is like device output, but as interpreted by
the human viewer. and that scene structure uh is often quite different (2.0) ((takes
(1) —› off slide)) **to what we call the °device structure.** ((looks up at audience)) **yeah.°** ((puts slide onto pile))
Aud: quickly. the conceptual model is just for the user of the system¿ not for the designer of the system¿
(2.0)
Pres: uh (.) alright. i'm sort of using the user maybe to mean human. uhm it's uh the (.) yeh. it's the level as seen by the by-I MEAN IT REALLY IS (.) according to the user of the system. uhm ↓because they're the ones that uh are looking for the information. or °are looking for the scene structures.°↑
(1.5)
(2) —› **°okay.°** ((picks up new slide))

(0.5)
(3) —› .h so ((puts new slide on OHP. title: "image scene")) uh just as an example of (.) maybe how a ay a scene, as perceived, differs from the scene as <the scene as a person sees it differs from the scene as the computer sees it>.....

This example shows how the interruption occurs at the end of a section. The audience member has interpreted the cues of quieter talk, removal of the old slide, and a quiet, falling intonation *yeah* as indicative of the presenter being at the end of a section (arrow 1). He then asks a quick question which the presenter answers, then pauses for 1.5 seconds, before saying a quiet *okay* and picking up the new slide (arrow 2). The new section is ready to commence (arrow 3). Therefore not only the presenter, but also the audience have a clear picture of the structure of a section.

Chapter 4
Uhm as Discourse Marker

4.1 Introduction

The discourse particle, *uhm*, occurs frequently and with varied distribution within seminar talk, being situated both at the beginning of sections and within sections. At the beginning of a section, its environment resembles the previously discussed discourse markers, *okay* and *so*, and subsequent analysis will demonstrate that in this position, *uhm* functions in a similar manner, that is, it also functions as a discourse marker. Within a section, *uhm* can be interchanged with *uh*, and the subsequent analysis will further demonstrate that in particular environments within a section *uhm* or *uh* can also function as a discourse marker. Because the notion of *uhm* or *uh* functioning as a discourse marker is at variance with the commonly held view of how such words generally function, care will be taken in drawing a distinction between *uhm* or *uh* as discourse marker, and *uhm* or *uh* as repair device or hesitation marker.

Although to date *uhm* and *uh* have not been the subject of specific research, they have been referred to in other contexts, such as their use in repair routines, as hesitation fillers, and as interjections. Discussions of self-correction or repair indicate that *uhm* or *uh* can be used to initiate repair following dysfluencies or hitches, such as cut-offs, pauses, or sound stretches (Schegloff 1979b: 272; Sacks, Jefferson and Schegloff 1977: 367). Brown and Yule (1983b: 15,106) refer to spoken discourse as containing interactive markers and planning fillers such as *well, uhm, you know, uh.* They note that such fillers are often associated with pauses and may be subtle indicators of topic shift. Similarly, James (1974, referred to in Schourup 1985) sees *uh* as an indication of uncertainty about what the speaker is saying, about whether he/she is using the right words, or about how the audience is reacting to his/her speech. Schourup (1985:151) notes that *uh* can mark a pause for any reason at all and that the function of *uh* is to mark a point of pause rather than a definitive halt.

Fraser (1990: 391) draws the distinction between discourse markers and interjections. His long list of interjections includes *okay, uhm* (spelt *ahem*) and *uh* (spelt *ah, ugh*). Whereas discourse markers signal the speaker's view of how the following talk relates to the preceding talk, he classifies interjections as separate 'sentences' (usually only a single word) in which the entire message is encoded. Because the message typically relates to the

emotional state of the speaker, Fraser concludes that interjections, such as *uhm* and *uh*, are simply pragmatic idioms.

The following analysis demonstrates that to simply view *uhm* or *uh* as repair devices, hesitation fillers, or pragmatic idioms is to overlook an important aspect of their function in seminar talk. Sacks, Jefferson and Schegloff (1977: 363) state that nothing is excluded from the class of the repairable, which implies that *uhm* or *uh*, as part of a repair routine, could occur randomly, at any point throughout a seminar. The following discussion shows that *uhm* and *uh* do not ccur randomly. When *uhm* and *uh* are analysed in detail, it becomes clear firstly, that not all occurrences of *uhm* and *uh* are associated with dysfluencies and uncertainty of speech and secondly, that the occurrences of *uhm* and *uh* in seminar talk are quite specific. In order to determine their precise function within seminar talk, the distribution of *uhm* and *uh*, together with their environment is analysed in detail. The analysis is divided into 2 major parts, *uhm* at the beginning of a section and *uhm* or *uh* within a section.

4.2 *Uhm* at the beginning of a section

There are two distinct ways in which *uhm* can occur at the beginning of a section. Either *uhm* is said more quietly than surrounding talk or, more frequently, *uhm* is given prominence by being said more loudly than surrounding talk, with raised pitch and with rising intonation. The analysis aims to show that the louder, more prominent *uhm* is, in fact, functioning as a discourse marker in this position, in contrast with the quieter, less frequent *uhm* which can also occur at the beginning of a section.

4.2.1. Prominent *uhm*

The following example illustrates how *uhm* can occur at the beginning of a section (Example 1).

Example 1
[Ro:9]

	Pres:	..... and the r-reader <at the other end knows that it's d-w¿ and knows to interpret integers> in the
		°big endian f [ormat.° [(4.0)=
	Action:	[takes slide off [puts slide on the pile, picks up the new one
→	Pres:	=↑t! **uhm:¿** (0.8) d-w- [f, apart from supporting↓ the the basic uh (.) uh data types=
	Action:	[puts new slide on OHP

Pres: =of <points¿ lines¿ an' polygons¿ and so on¿> ↑has a number of other features in it¿↓ uh¿ it has support for rasta data¿ uhm¿ so i can include (.) uhm (.) t! a rasta bit back image in that °data stream if i want to it¿° it has support for uh text¿ uh¿ (1.5) it has support for icons¿ and attribute information¿ like go¿ °with with geographic data.°.....

In this example the presenter closes off the previous section with faster, quieter talk, during which he takes the old slide off the projector. He pauses for 4 seconds while he puts the slide on the pile and picks up the new one. He then gives a dental click, says an elongated *uhm* with rising intonation and with raised pitch (arrow), pauses for 0.8 seconds, before commencing the new section still with raised pitch. Part way through the first word, he places the new slide on the overhead. Example 1 shows how *uhm* can be given the prominence normally associated with the start of a section. In fact, the picture we see here of *uhm* at the beginning of a section looks very similar to the way in which other discourse markers, *okay* and *so*, occur in this position. It looks as *uhm* is is functioning as a discourse marker when used in this manner. However, in order to show that this is the case, it is necessary to demonstrate that *uhm* is neither being used as repair device nor as a hesitation filler.

It is clear from the above example that in this position *uhm* is not being used as a repair device. There is no evidence of trouble, no repetition of words, false starts, or sound stretches. It is not being used as part of a word search, because the presenter is not confused and uncertain about being able to continue. In fact the presenters are generally very calm throughout their talks, particularly at the beginning of the section where they quietly change overheads and often simply stand, hands by their side. It is not being used as in conversation, in response to a question where the respondant is accountable if they do not immediately respond. In seminar talk, turn-taking has been suspended and the presenter has the right to speak for the allotted period of time. This includes time to pause for effect and time to change slides.

Although *uhm* is not being used as a repair device, it could be argued that it is being used as a hesitation filler, either for planning what to say next (Brown and Yule 1983b) or to fill in or mark a pause (James 1974, Schourup 1985). The first notion, that *uhm* marks a planning filler, seems unlikely. The seminars under study can be considered as planned in that the overhead slides were prepared in advance. As a result, presenters move one by one through a pile of pre-ordered overheads. Therefore planning time can be kept to a minimum. Similarly, *uhm* seems to be doing more than simply filling or marking a pause. *Uhm* is generally said late in the total pause time. In Example 1, there is a 4 second pause, followed by *uhm*, followed by a 0.8 second pause, before the beginning of the new section

commences. *Uhm* can be clearly seen to 'belong' to the beginning of the new section, as demonstrated by the prominence given to it. We saw from the discourse markers *okay* and *so* that prominence at the beginning of a section is a strong indicator that the particle belongs to the new section. This accords with the fact that *uhm* is often preceded by an audible intake of breath or a dental click indicating that the speaker is about to commence the next section. In addition, *uhm* is said with rising intonation, indicating that something is about to follow.

When occurring in this position, *uhm* therefore seems to be functioning as a discourse marker. In the data, sections typically commence with a discourse marker(s), to inform the audience as to the structure of the talk. Discourse markers in this position include *okay, so, now*. Example 1 shows how *uhm* also seems to be playing this discourse marking function. It occurs alone in this position, with no other discourse marker being present. Therefore, *uhm* resembles other discourse markers which occur in this position.

4.2.2 Quieter *uhm*

The argument that the above prominent *uhm* is functioning as a discourse marker can be further strengthened by the fact that there is another type of *uhm* which also occurs at the boundary. The following example illustrates this other type of *uhm* (Example 2).

Example 2
[Ma:2]

Pres: ..... uhm¿ <<as a result it's quite complicated¿ so i'm not going to explain it all to you no:w¿ i'm just going to let it sit up there¿ and for the rest of this talk,>> i'll just talk about little bits of it uh as we go along. maybe by the end¿ uhm °some of it (.) ((picks up sheet)) will've soaked into your subconsious.° ((puts sheet on pile))

(1) → Pres: (1.0) °°**uhm**°° (1.0) [(1.0)=
Action: [picks up new slide

(2) → Pres: =.h ↑so FIR [ST OF ALL, (1.5) uh (.) what's it for¿ (.)=
Action: [puts new slide on OHP. title: "what's it for"

Pres: =t! uhm¿ (.) well really what it is, is a is a (.) uh:: (.) is an attempt to provide a mathematics for↓ information display. a descriptive mathematical language. (.) uhm¿ ↑but here are some of the things that (.) that a good model of some area should do¿↓ ((runs hand down list)) <and i'm hoping this one does¿> .....

In this example, the presenter finishes a section, indicated by quieter talk and taking the slide off the overhead projector. He then pauses for 1 second and says a very quiet *uhm*

(arrow 1), followed by a further 2 second pause, before he breathes in and with raised pitch commences the new section with *so FIRST OF ALL, (1.5) uh (.) what's it for¿*

This type of *uhm* (Example 2) is quite different from the previous *uhm* which is functioning as a discourse marker (Example 1). In this case, *uhm* is functioning as a filler, as suggested by James (1974) and Schourup (1985). The presenter is doing private talk. He is saying a quiet *uhm* to himself while pausing briefly. As Schourup (1985: 151) notes, he is marking a pause.

Immediate differences can be noted between this filler *uhm* and the more prominent discourse marker *uhm*. Firstly, there are differences in prosody. The filler *uhm* is said more quietly than surrounding talk and is not said with a distinctive intonation marking. This contrasts with *uhm* as discourse marker which is given prominence, generally associated with the beginning of a section, by being said more loudly than preceding talk, with raised pitch and with rising intonation, often following a dental click. Secondly, the filler *uhm* does not occur alone at the boundary. The beginning of the section (Example 2) is marked by the discourse marker *so*(arrow 2), said more loudly than preceding talk, with raised pitch and following an audible intake of breath. This contrasts with the discourse marker *uhm* which can occur alone, as in Example 1. Thirdly, the filler *uhm* occurs in the middle of the total pause time, contrasts with *uhm* as discourse marker, which occurs near the end of the total pause time.

Such instances of *uhm* acting as a filler are not common in seminar talk. In the data there are many more instances of the more prominent *uhm* (a total of 110), which seems to indicate that *uhm* predominantly functions as a discourse marker in this position at the beginning of a section. In addition, of the 9 instances of *uhm* functioning as a filler in this position, 4 of these 9 instances are associated with the presenter physically moving from one part of the room to another, as shown in the next example (Example 3).

Example 3
[Mi:26]

Pres: ..... <°a bit of an assumption. but good enough.°> uhm¿ which gives me a drag
coefficient of air density, which gives me a drag ((points to screen)) coefficient of point
Pres: three ((points to screen)) one. [(2.0) which is really quite high.
Action: [starts walking back to computer

→ Pres: [(2.0) °**uh** [**m**° (0.8) so (1.5) the other thing i did, (1.0) [(1.0)=
Action: [still walking [standing at computer [clicks on mouse

Pres: =°is it on the next [slide?° (.) is i built this [device.=
Action: [new image [picks up device

=i thought, i've got the answer to this one¿ what this is, is a, it's basically uhm a a beam balance. with a rubber band on one end¿

This example shows how the presenter says a quieter *uhm* after moving from the larger screen back to the computer, where he needs to click on the mouse to put up a new image. He finishes talking at the screen, takes 2 seconds to walk back to the computer, says a quiet *uhm* (arrow), followed by a short pause, before launching into the new section with *so (1.5) the other thing i did.* This example illustrates how *uhm* functions as a filler while the presenter is physically doing something.

4.2.3 *Uhm* while doing something

The above example (Example 3) opens up the possibility that the more prominent, discourse marker *uhm* could also simply be filling in time while the presenter is doing something, such as for example, interacting with the overhead slides. In Example 1, we saw how this *uhm* occurs in a similar environment to putting the new slide on the overhead projector.

The presenter generally interacts with the overhead slide or computer at the boundary of a section. As a result, it could be argued that while this is occurring, the presenter could say *uhm* to fill the pause. If this were the case, *uhm* would simply be functioning as a filler. I would like to argue however, that although *uhm* occasionally functions as a filler in this position (Example 3), to limit the function of *uhm* in seminar talk to merely that of a filler, is to overlook what is actually happening at the boundary. When *uhm* functions as a filler (Example 2 and 3), it is said more quietly than surrounding talk, it is not said with rising intonation, and it may be associated with movement of some sort such as moving across the room. In addition, the following section is always marked by a discourse marker, for example, *okay* or *so*. In other words, the quieter, filler *uhm* never occurs alone at the boundary. This contrasts strongly with the louder, raised pitch *uhm.*

The data shows that the louder, raised pitch *uhm* occurs at the same time as the presenter puts a new slide on the overhead projector. However, it is not simply playing the role of filler. Although interacting with overhead slides could also be seen as *doing* something, such an action seems to be different. Putting overhead slides on the projector is a sanctioned activity within the context of seminar talk. It is expected that presenters will use overheads and that taking overheads off and putting new ones on the overhead projector takes time. It is therefore unlikely that the presenter feels the need to fill in the time while

the change of overheads occurs. This is quite different from walking across the room, for example, to pick something up from the demonstration table. Such an action is not sanctioned and therefore it is understandable if the presenter uses *uhm* as a filler to indicate that talk will resume shortly.

There are only 9 examples of where a quieter *uhm* is used at the boundary, 4 of which are associated with movement across the room, compared to 110 examples of the louder, more prominent *uhm*. If a filler were required when the presenter were interacting with the slides, why does the quieter *uhm* not occur more frequently? In addition, if the louder *uhm* also plays the role of filler, why is there a difference in prosody? Why are some said more quietly than others? And why is rising intonation a constant feature of the louder *uhm*? When a presenter begins a new section he generally raises the pitch or speaks more loudly to project his voice. If *uhm* is said with raised pitch and louder voice, it can be seen as belonging to the new section. If *uhm* were just a filler, it would not seem to be necessary to say it more loudly or with raised pitch. It could be said quietly, as is the case in a few examples where *uhm* does function as a filler (Example 2 and 3). In addition, the pattern at the boundary between the two sections in the case of the discourse marker *uhm* is always the same. The presenter has a longer pause during which he fixes up the overheads, followed by *uhm* and then a shorter pause. If *uhm* were simply accounting for the fact that the presenter needed to provide a filler to mark a pause, why not say *uhm* during the longer pause while he is organising the overheads? The fact that this does not occur seems to indicate that *uhm* is playing a different role in this position.

4.2.4 If the louder, raised pitch *uhm* is <u>not</u> functioning as a filler, what is its function?

The previous chapters showed how presenters tend to mark the macro-structure of the talk by clearly marking the beginning and the end of a section. In particular, at the beginning of a section, we saw how *okay* plays a closing off function, indicating to the audience that one part was finished as well as indicating readiness to begin the next part. We also saw how *so* marked the start of a new idea by initially orienting the audience to what was going to be covered, prior to the start of the new topic of the section. Analysis of the data shows that one of the presenters, Roger, does not use *okay* or *so* to mark the macrostructure of the talk. Instead he appears marks each new section by *uhm,* as illustrated by the following example (Example 4).

Example 4
[Ro:2]

Pres: .....°so hopefully ((moves left arm about)) this is a bit of a rehearsal for me, to get thoughts together.°
(2.5)

(1) → Pres: ↑t! **uhm¿** (1.0) ((stands and looks at OHT, hand on chin))
what i'll cover ((points down at OHP)) briefly↓ today¿ is just look at some of the g-i-s requirements that we looked at. the g-i-s on the internet. uhm¿ and then i'll look at some of the systems that are currently available¿ (1.0) uhm¿ (1.5) t! then some of the formats¿ that you might be (.) uh using if you're a developer. <°°uh looking at°° the way of developing °systems to deliver g-i-s over the internet¿° or the web¿> (1.0) uhm¿ ((reads from OHT)) some of those data types, one in particular actually or one protocol ↓in particular that °we used for our work.° there's a couple of them floating around.↑ none of which are comprehensive. °all that comprehensive.° ↑i'll look at handling some of the g-i-s data requirements.↓ <uh at the client end.> given that the client's basically a web browser. one of the popular web browsers that we know and love. ↑and then (1.5) uh lastly¿↓ i'll have a look at a a couple (.) i'll show you hopefully a couple of our demos that we've done. °in the last few months.°
(8.0) ((takes slide off and puts on pile. organises next slide))

(2) → Pres: .hh **uhm¿** (2.0) ((stands and looks at OHT))
Pres: look [ing at the require [ments for g-i-s¿ (1.5) uh (1.0) that we were given¿=
Action: [picks up new slide [puts new slide on OHP

Pres: =uhm (0.8) ↑we've done a number a number of collaborative projects.↓ with with °uhm° commercial partners.

The example shows the end of a section, marked by *so*, followed by a 2.5 second pause. This is followed by raised pitch talk, which is a feature of talk which occurs at the beginning of a section. However, what the presenter actually says is *t! uhm¿* followed by a 1 second pause (arrow 1). During the pause the presenter, stands and looks at the slide. It is only following the pause that the presenter actually tells the audience what the topic of the section is about. At the end of that section, the slide is taken off and the presenter takes time to organise the next slide. He then breathes in, says *uhm* with a rising intonation and pauses for a further 2 seconds while looking at the slide (arrow 2). As before, it is only following the pause that the presenter actually moves onto the topic of the next section.

The question is, what is going on here. The picture seems to be very similar to how other presenters mark a new section, although they generally do so either by using *okay* or *so*, or by using the composite *okay so*. In this case, however, the presenter seems to be using *uhm* to do a similar thing. The environment is very similar to the way in which *okay* and *so* occur at the beginning of a section. Both *okay* and *so* occur following a pause, in connection with changing the overhead, and at the beginning of a section with either raised pitch or louder voice. Therefore given the consistency in the environment, it can be argued that just like *okay* and *so*, *uhm* is being used by the presenter to mark something. In this

case, it is marking the fact that the presenter is between bits or sections. Something has been said and something more is to come.[1] If it were simply being used as a filler when the presenter was accountable in some way for not speaking, its occurrence would be random. This is not the case. It occurs systematically at the beginning of a section for the presenter who does not use other markers, such as *okay* and *so*, to indicate the macrostructure of the talk. In addition, it is never repeated in this position, whereas when it is used as part of a repair sequence or as a filler it may be repeated (Schegloff 1987: 71).

Roger is the only presenter who uses *uhm* exclusively at the beginning of a section. The only time he uses *okay* is when the launch of a new section seems to fail, when he uses the possibly more powerful *okay* to indicate the closing off of that bit (Example 5).

Example 5
[Ro:4]

Pres: ...(1.5) ↑but again¿ if if you look at those in any detail¿ their glossy brochures are great¿↓ but °uh° when you look at the technology they've really just rebadged their existing products. and done a fairly poor job (1.0) .h °uh i think° in in turning them into °web based products¿° ((puts hand on OHP machine)) (1.5) °°uh <poor is a very relevant term there¿°°>

(1) → Pres: (1.0) [(0.5) [↑uhm¿↓
Action: [starts to take slide off [puts it back on

(8.0) ((takes slide off and puts it on the pile, picks up the new one and puts it on the OHP))

(2) → Pres: ↑**oka::y.** if you're going to deliver (0.8) g-i-s data over the internet,↓ (1.0) °uhm° (2.0) ↑we were talking about- when i talk about g-i-s¿ i essentially mean vector data.↓ sure g-i-s systems cover a range of data sets, but typically they're vector data sets. °uh° they include raster data¿ which i'll talk about, but the primary uh data set, primary data types, are points¿ lines¿ and polygons. °uh° described in a vector format.....

In this example, it looks as if Roger was confused about whether to change the slide or not. He starts to take the slide off, but puts it back on the projector as he says a raised pitch, rising intonation *uhm* (arrow 1). He then pauses for 8 seconds during which he changes the slide. Following the confusion, he does not use *uhm* which is what he normally uses at this point, rather he commences the next section with *okay* (arrow 2). This is the only time he uses *okay* in his talk, and it is possibly due to the slight confusion at this point. In addition, he has already used *uhm* at arrow 1, yet it did not lead into further talk. This supports the argument that the louder, raised pitch, rising intonation *uhm* is not a filler, it is

[1] In conversation, *uhm* can occur at the beginning of a turn. It has been suggested by Schegloff (personal communication from Tony Liddicoat) that *uhm* is used to indicate the speaker's readiness to start the turn, although initially no content is provided. This seems to accord with the above analysis. In the case of conversation, *uhm* indicates that something is about to come; in the case of seminar talk, *uhm* indicates that there is more to come.

indicating that more talk is about to come. In this way, it is acting as a marker, in a similar way to *okay* and *so*.

Other speakers generally use *okay* and *so* to mark the beginning of a section, especially when a slide is changed. However, there are instances of these presenters also using *uhm* singly in this position, although less frequently. The following example shows one of the few occasions that Mitchell uses *uhm* on its own in this position (Example 6).

Example 6
[Mi:24]

Pres: .....the errors are sort of °you know uhm° twenty -five¿ ((peers at screen)) thirty-eight¿ and thirty-one¿ percent. so that's something for everyone to puzzle over, (.) ↑why is this so.↓ °harry miller. what's his name¿ julias summer miller.°
Aud: ( )

Pres: (1.0) [(0.5)=
Action: [new image
→ Pres: **=uhm¿** (1.0) ↑the second thing i did is, i i measured, i measured this sort of photograph here,↓ ((holds up photograph)) (.) uhm¿ and again i i compared it to actual actual flight¿ ((walks over to screen)) here are two graphs here¿↑and again you can see that the the ((points to screen)) measured displacement, which means velocity¿ and acceleration¿ are higher than that of the predicted ((points to screen)) values. now if i (.) increase the flow of water out of the

The arrow indicates where *uhm* occurs at the beginning of a section, associated with changing a slide. It is surrounded by pauses, it is said louder than preceding talk, and is said with rising intonation. This follows the pattern of how Ross uses *uhm* at the beginning of a section, although in this example the presenter does not use raised pitch.

Another example from Mark shows a similar pattern (Example 7).

Example 7
[Ma:20]

Pres: ... but what we really want↓ is to transform that to a function of two variables x and y. and a °sort of scattergram.° so (.) the (.) well the (.) »the way ((takes slide off)) the data is collected isn't necessarily °the way ((puts onto pile)) you want to wor- use it. i suppose.°

(2.0) ((puts new slide onto OHP. title: "Streamlines"))
(1) → .h **uhm¿** (1.0) ↑here's another example¿ uh:¿ (1.0) sort of. that if you have a↓ (2.0) u:::h this ((points)) is generated as sort of fluid dynamics examples. where you have a ↑3-d model, and at each point you have a vector telling you where the uhm where the fluid's going¿↓ then you can sort of do some integration¿ to get little stream lines¿ that sort of tell you what's happening to a individual particle. uhm¿ and sort of in that case what you're doing is »truth processing the data to extract a higher level of information which is easier to work with.

(2) → Pres: [(2.0) [(1.0) [↑**UHM¿** [(3.0)=
Action: [takes slide off [puts onto pile [picks up new slide [puts new slide onto OHP
Pres: =t! AND ANOTHER (2.0) common example is dimension reduction, where you start with a a very high dimensional space¿ <which is sort of like more that two¿> .h uhm¿ there aren't many (1.0) you may not know many scene spaces which have (.) uh (.) dimensions higher than two¿ so you have to .....

Here again, we can see how *uhm* occurs at the beginning of a section, associated with the changing of slides (arrow 1). It is surrounded by pauses, it is said in a louder voice than preceeding talk, it has rising intonation, and it follows an intake of breath. *Uhm* is functioning similarly at the second arrow. There is a 3 second pause, during which the old slide is taken off and put onto the pile. The presenter then says a louder *uhm* with raised pitch and with rising intonation. It is followed by a further 3 second pause during which he puts the new slide on the projector. Finally, he gives a dental click and commences the new section with *AND ANOTHER (2.0) common example is dimension reduction.*

These examples show that although there is one presenter (Roger in Examples 4, 5) who seems to exclusively use *uhm* in this position, other presenters also use *uhm* in this way (Examples 6, 7), although their preference seems to be to use *okay* or *so*. However, there is yet another possibility, illustrated by Arthur (Example 8) who, although he uses *uhm* to mark a new section, often combines it with the discourse marker *okay* or some other marker such as *so, now* or *yeah.*

Example 8
[Ar:1-2]

..... uhm¿ ((moves slide up)) possible applications¿ we've got basically anything that involves signals¿ so¿ (.) °uhm¿° i've just written those down¿

(2.0) ((moves slide up))
(1) → **U::HM::¿** (1.0) SO (1.0) well firstly i suppose i should define wavelets themselves¿ (1.0) UHM¿ (1.0) THEY form into two classes or two two classes of function¿ one is the scaling function¿ (.) uhm¿ which is used to represent the low frequency information¿ of the signal¿ UHM¿ and the other is the wavelet. which is used to represent the high frequency (.) uhm component. (.) UHM¿ what happens¿ these are translated into scales¿ uhm¿ then they're summed together¿ with uh with various coefficients, °multiplied by them, to uh reproduce a function.°

(1.5)
(2) → **U:HM::¿** (1.0) ((moves slide up)) NOW. i've just got an example here¿ of a particularly useful application of wavelets¿ °uhm° which is the saw-tooth wave¿ (.) uhm the wave looks like this¿ (9.0) ((draws on board)) uhm¿ and if you sample that at a rate of °uhm° (.) 256 uh samples per second¿ (.) uhm¿ then you will in fact need uhm 256 coefficients in your frame expanse to represent it. uhm¿ the wavelet that you get is in fact only sixteen ( )¿ which is the right wavlength¿ ((takes slide off)) °so it's a lot more more efficient.° ((puts slide on pile))

(2.0) ((picks up new slide))
(3) → **UHM¿** (1.5) ((puts new slide on OHP)) THE OTHER ISSUE is speed. wavelet transforms uhm can be computed in order n cycles¿ UHM¿ this- most transformers are computed in n squared¿ or n

squared cycles¿ and even the n squared transform uhm is order n log n. so in fact this is uhm quite good¿ uh what multiple you've got before that n¿ °uhm° <depends on the wavelet¿> °so a complex uhm wavelet¿ will in fact require an order of something big times n¿°

(1.5)

(4) → **U::HM¿** ((moves slide up)) (1.0) t! OKAY. THE OTHER ONE IS uh sparcity¿ (.) UHM::¿ that issue is about basically (.) uhm how few co-efficients uhm you can represent in simple¿ uh in signal¿ uh data, and uh °sparcity is good because it <means that you have represented your entire signal, in very few uhm co-efficients¿>° .....

Once again we can see how *uhm* is being used at the beginning of a section in a way which is very similar to the other presenters. As with the other presenters, *uhm* is surrounded by pauses, it is said louder than preceeding talk, and it is said with raised intonation. In addition, it seems to be associated with adjusting the slide or putting the slide on the overhead projector.

Therefore we can conclude that when the louder, raised pitch *uhm* occurs on its own, in this position, it is playing a function similar to other discourse markers which occur in this position. In other words, the presenter is indicating the macrostructure of the talk to the audience, although in this case, the marker is different. The question is what is *uhm* actually marking. I have shown that the way in which *uhm* occurs at the beginning of a section is consistent. I have also suggested that *uhm* seems to function as an indicator of more talk to come and seems to be associated with putting a new slide in place or adjusting an existing slide. I would like to argue this further by comparing the function and role of *uhm* with that of *okay* and *so*.

4.2.5 Possible combinations of *uhm*, *okay* and *so*

The environment of these three markers is clearly similar. I have used the similarity of environment to argue that *uhm* is not acting as a filler, rather it is indicating something about the macrostructure of the talk. The following analysis will show that *uhm* is playing a different function to *okay* and *so* by demonstrating that the three discourse markers are not interchangeable. The presenter makes a choice as to which marker to use, and depending upon that choice, the audience is given different information.

In Chapter 2 we saw how *okay* can simultaneously mark closing off, and topic shift. *So* on the other hand (Chapter 3), initially orients the audience as to what the new topic is going to be about prior to the actual launch of the new topic. We saw how the position of *okay* and *so* concurs with the function they play, with *okay* always preceding *so*. Their intonation also concurs with their functions. *Okay* is always said with falling intonation at the

beginning of a section whereas *so* is said with no intonation contour. The interaction with the overhead slides also concurs with their functions. Saying *okay* coincides with the speaker interacting with the slides, either taking the slide off, putting it on the pile, or putting the new slide on the overhead projector. The *so + orientation phrase* also interacts with the slides, in that the new slide is always in place before the end of the orientation.

Unlike *okay* and *so*, *uhm* carries no official semantic meaning. It simply indicates to the audience that more is going to come; that the speaker is between one part and the next. As a result it can occur in a variety of positions. So far we have only been looking at where *uhm* occurs at the beginning of a section in isolation. In this environment, it is surrounded by pauses ranging from 1 second up to 6 seconds. This is slightly different from both *okay* and *so*, where there tends to be no pause following the marker, although it can occur. Having a pause after *uhm* seems to be in keeping with its suggested function, that of being between bits, indicating that more is to come. It could also be connected with adjusting the slide or putting it on the projector. What seems to be clear, is that its function is quite different from the other two markers. This is important, because if the three markers play different functions, they cannot be used interchangeably.

Analysis of the data indicates that a number of different combinations are possible, with *uhm* occuring both before or after either *okay* or *so* (Table 1).[2] The fact that so many combinations occur, although there are not many instances of each, is initially surprising. This is because the functions of the three different markers should mean that some combinations are not possible. For example, if *uhm* precedes *okay*, the presenter must first be saying there is more talk to come, and then closing off the previous talk, before indicating readiness to commence the new section. That sounds unlikely. The following analysis will examine each combination in detail to ascertain why such combinations appear in the data. Analysis of the variety of positions of *uhm* in combination with *okay* and *so* is important. Firstly, in clarifying the function of *uhm*, but secondly, in that it should strengthen the analysis of *okay* and *so* carried out so far.

[2] As is to be expected from our previous discussion of *okay* and *so*, the possible combinations do not include examples of *so* preceding *okay*.

Possible combinations of discourse markers at the beginning of a section
a) *okay uhm*
b) *uhm okay*
c) *uhm so*
d) *so uhm*
e) *okay uhm so*
f) *okay so uhm*
g) *uhm okay so*

Table 1: *Possible combinations of* uhm *co-occurring with* okay *and* so

4.2.5.1 *okay uhm* composite at the beginning of a section

The combination *okay uhm* would seem to be possible, if *okay* were playing a closing off role, followed by *uhm* indicating there is more talk to come. This is exactly what occurs. When *okay* is followed by *uhm*, it is the first type of *okay* ($okay_1$), with emphasis on the closing off aspect. In the data, such a combination follows a question or an interaction with one of the tools, the overhead, the computer or the video. The combination, *okay uhm*, therefore does occur, although not very often[3] (Example 9).

Example 9
[Mi:8]

..... thus the volume of water in the bottle, is decreasing. which means the volume available for gas inside the bottle, is increasing. so the gas pressure is reducing.↓ (2.5) everyone followed that bit? °okay?° »now unfortunately the gas temperature is also going down, which is an added complication, uhm¿ and i¿ ↓ <haven't had a chance to deal with that bit yet¿>↑ we'll see that later [on.

Aud: [°use hot water?°=
Pres: =sorry?
Aud: use hot water?
→ Pres: hh hh ((laughs)) **okay. uhm¿** (2.0) ↑now the force that's caused by the water being shot out the end, has to overcome gravity¿↓ which is the weight of the rocket¿ and it has to overcome the aerodynamic drag. now <initially the aerodynamic drag is zero, because the rocket's not moving,> but as it speeds up, the <aerodynamic drag becomes quite substantial.> ↓in fact uhm four or five times the force exerted by gravity.↑ (2.0) uhm¿ so the s surplus force <after we've taken all that into account, is used to accelerate the rocket.>

[3] Sometimes the functionally similar *alright uhm.* is used in this position. There are a couple of examples of *okay? uhm*, which I'm assuming is different, because *okay?* is playing a checking role.

In this example, a member of the audience interrupts the presenter to make a suggestion. The presenter laughs briefly, then says *okay* with falling intonation (arrow). He then says *uhm* with rising intonation, pauses for 2 seconds before continuing with the talk. This example is typical of the way in which *uhm* can follow *okay*, with *okay* closing off the interruption, enabling talk to continue and *uhm* indicating that there is more talk to come. The new section then follows with raised pitch, following a 2 second pause.

A further example from Paul shows a similar picture, with *okay* playing a closing off role (Example 10).

Example 10
[Ph:16]

	Pres:	..... if you're going to uh build uhm uh for instance a lane to to if that's a a right hand turn lane¿ then you've got a °fairly good idea of how long tha uh that lane should be.° there was a couple, uh one here, one hundred fou:: [r, which °i'll show you uhm (.) a picture of.°
	Action:	[walks over to OHP
		(8.5) ((picks up slide and walks back to screen to check slide against image on screen))
(1) →	Pres:	**°okay.°** [(1.0)
	Action:	[walks back to OHP
(2) →	Pres:	**uhm¿ and this just demonstrates** ((puts slide on OHP)) the uhm the the thing ((turns OHP on)) that i was talking about, uh with cidra, uhm this is node one hundred¿ and the different approaches¿ .....

In this example, Paul indicates to the audience that he wants to illustrate what he is talking about with a picture. He pauses for 8.5 seconds while checking that he has the correct slide. He then says a quiet *okay* (arrow 1), followed by a 1 second pause, followed by *uhm¿ and this just demonstrates the uhm the the thing that i was talking about* (arrow 2). This illustrates again how *okay* closes something off. The presenter took a bit of time to find the correct slide and only after that part is finished and he knows he has the correct slide, does he say a quieter *okay*. The new section begins with the marker *uhm* with rising intonation, indicating that more talk is about to come.

Mitchell only has one example of this combination. It is slightly different in that it does not seem to be in connection with an interruption, rather it occurs following a long aside (Example 11).

Example 11
[Mi:28]

Pres: ....now unfortunately they don't seem to make five litre pet bottles. ((laughter)) which is a big disappointment. uhm¿ as you can see the people over at the energy research centre, <they thought they'd cracked it.> these ((points to bottles)) are a whole series of bottle joined together. but as you can see, they haven't actually increased the the volume¿ per unit mass¿ very much at all. in fact¿ <they've probably gone backwards. but they have improved the aero aerodynamics quite a lot.> °uhm¿° and »also <they've introduced the problem of how to join all these bottles together¿ which is quite a challenge.> °uhm¿° glueing you might think is quite a sound idea¿ <but it isn't.>

(3.0)

→ Pres: **o k [a::y. uhm¿** (3.0) t! ↑what about water.=
Action: [new image

Pres: =well presumably as you add water¿ it goes better and better. but if you add too much water¿ you start to consume the air (.) the space available for the gas.↓ (1.0) okay? uhm¿ and <↓i didn't know about this yesterday, but i figured it out with some help from don today.↑> uhm¿ so¿ up to about half the mass (.) half of the volume of the bottle of water is a good, beyond that it's not good. uhm¿ ((goes to demo table)) there's another problem, in that if you get too much water in the bottle¿ uhm¿ ((picks up)) the centre of

At the beginning of this section (not given in the example), Mitchell says how bigger bottles are generally better. However, he then spends quite a bit of time talking about the limitations of bigger bottles, using the work of the Energy Research Centre as an example. It is only after this quite long aside, that he pauses for 3 seconds, says *okay* with falling intonation (arrow), clicks on the mouse for the new image, says *uhm* with rising intonation, pauses again for 3 seconds with a dental click, before he moves onto the next topic with raised pitch, *what about water*. This example seems to fit in with the other situations in which *uhm* follows *okay*, in that it is associated with earlier laughter, and a detailed aside. The *okay* is therefore closing off the previous section. The raised pitch does not begin until after the final pause. In addition, just before this section, the presenter mentioned that he had to hurry along. Clearly he is feeling the time constraint at this point. *Okay* could also be used at this point to move things along.

What emerges from the above examples (Examples 9, 10, 11) is that *okay* and *uhm* are different, even though they have a similar distribution. The examples show how the *okay* is playing a closing off function, enabling talk to continue. In all the examples of this *okay uhm* combination, the *okay* is $okay_1$, with emphasis on the closing off role. The *uhm* then indicates that there is more talk come.

However one of the presenters, Andrew, uses the composite *okay uhm* much more frequently than the other presenters, and he seems to use it differently. As a result, the way in which he uses *okay uhm* needs to be looked at separately. He appears to be using *uhm* in

two different ways at the beginning of a section. Andrew is a 3rd year vacation scholar who was required to give a seminar towards the end of a 3 month stay with CSIRO. Clearly he does not feel very confident about giving a presentation in front of older, experienced CSIRO research scientists. He nearly always uses *uhm* at the beginning of a section, but unlike Roger, who uses *uhm* to the exclusion of other markers, Andrew often uses *uhm* in combination with another marker, in particular, the combination *okay uhm* (11 times). The following example will provide the basis for talking about how he uses the combination *okay uhm* (Example 12).

Example 12
[Ar:5]

Pres: ..... we store the detailed coefficients where the odd ones used to be¿ and then we've stored this function here¿ uh this uhm sequences here where the even ones used to be¿ °uhm¿ that's also very easy to [to reverse.°
Action: [takes slide off

→ Pres: (1.0) [(1.0) [(0.5) **OKAY. [uhm¿=**
Action: [puts on pile [picks up new slide [puts slide on OHP

Pres: =this is basically what i've just done, in diagrammatic form, (.) U:HM¿ so what we've done is split it into two¿ (.) UHM¿ then with the even ones, we've used the proof that we've done the odd coefficient-sorry minus the predict operator acting on the even ones¿ and that's been the detailed coefficients¿ and the detail detailed coefficients acted on by the (outgrade) operator¿ added to the even coefficients, to produce the low frequency uh (information).....

In this example, Andrew uses the combination *okay uhm* at the beginning of the section (arrow). The presenter removes the slide at the end of the previous section, he then pauses for 2.5 seconds during which he puts the slide on the pile and picks up the new one. He then says *okay* with falling intonation and in a louder voice. This is followed by *uhm* with rising intonation, during which he puts the new slide on the overhead projector. The presenter immediately says what the topic of the section is about *this is basically what i've just done, in diagrammatic form.*

I would like to argue that Andrew is using *uhm* instead of *so*, although this is not to say that for him they have the same function. Andrew appears to choose to use the weaker *uhm* rather than *so*, because the composite *okay so* is too strong for him to use in this situation.

There are a number of reasons for saying this. Firstly, this example (Example 12) looks quite different from the previous examples of the combination, *okay uhm. Okay* is the second type of *okay* (*okay*$_2$), said with increased volume, rather than *okay*$_1$. This means that the emphasis is on the topic shift aspect of *okay*, rather than on the closing off aspect. Secondly, it is not surrounded by pauses, as is generally the case when *uhm* occurs at the

boundary. Instead, it seems to follow the pattern for *so*, where there are generally no pauses either before or after *so*. The following example shows the difference between the two *uhms* (Example 13).

Example 13
[Ar:8]

Pres: ..... (1.5) UHM¿ and that's another one where we shift the average wavelet coefficients and that also helps, °but uh [m (.) yeah. (.) i didn ['t use that°.
Action: [takes slide off [puts slide on pile))

(1) → Pres: [(2.0) **OKA::Y. [uhm** now we're going to look at what=
Action: [picks up new slide [puts new slide on OHP

Pres: =actually came out of the program. (2.0) UHM¿ (.) THE FOLLOWING EXAMPLES that are to use polynomial interpolation¿ uhm with the mirror value conditions. I just, i described¿ (.) uhm¿ this is going to be my input signal each time, just a noisy sinusoid. so °it's uhm (1.5) yeah. [it's not particularly special [in any way.°
Action: [takes slide off [puts slide on pile))

(2) → Pres: (1.5) **u::hm¿** [(3.5) [HERE IS THE FIRST signal=
Action: [picks up new slide [puts new slide on OHP

Pres: = that i got out¿ uhm¿ i have a threshold of 3 which is in fact quite high¿ (.) uhm¿ and i'm applying the high threshold method.....

Arrow 1 shows an example of *uhm*, which could be substituted by *so*. This contrasts with *uhm* at arrow 2, which is surrounded by pauses and is functioning as the discourse marker *uhm* that was discussed earlier.

Thirdly, although in Example 12 *uhm* is said with rising intonation, Example 13 illustrates that this is not always the case. This mirrors the situation for *so*. Generally, as with *so*, Andrew uses *uhm* in this position with no intonation contour. In addition, as with *so* in this position, *uhm* is sometimes said louder than surrounding talk and sometimes softer.

Fourthly, *so* is always followed by an orientation phrase. The same thing occurs in this situation, with the orientation phrase either referring to the slide that has just been put on the overhead projector (Example 12), or, with the use of *now*, telling the audience what is going to be covered next (Example 13). However, the orientation phrase following *uhm* is more limited than that following *so*. The option of referring backwards or asking a rhetorical question does not seem to be available following *uhm*.

It looks as if Andrew therefore chooses to use *uhm* at the beginning of a section in two different ways. The first way is to mark the beginning of a section. This *uhm* is generally surrounded by pauses, is louder than surrounding talk and is not often in association with

another marker. The second *uhm* occurs following *okay*, where it seems to take the place of *so*. Andrew also uses the quieter *uhm* as a filler, which was discussed earlier (page 81). Therefore Andrew uses *uhm* at the boundary in three different ways. Additional evidence for his use of *uhm* instead of *so* is the fact that *so* does not occur in this position, at the beginning of a section. Whenever *so* is used in his talk, it is used in its resultative sense or to mark a resolution of an idea at the end of a section. Whenever *uhm* and *so* co-occur, as they occasionally do in the middle of a section, *so* is always being used in its resultative sense.[4] Furthermore, there is one example which shows how Andrew uses *uhm* in both ways at the boundary (Example 14).

Example 14
[Ar:3]

	Pres:	..... and so if you've got for instance ((goes to blackboard)) a nuclear magnetic resonance in ( ) °sort of like this, (2.0) ((writes on blackboard)) and you use traditional ( ) methods to get that, ( ) whereas uhm the wavelets won't ((walking back to OHP)) in fact do that.°
		(2.0)
(1) →	Pres:	**U::HM:** [:¿ (2.5)=
	Action:	[moves slide up
(2) →	Pres:	=t! **OKAY. uhm** the traditional method of uhm (.) wavelet transform is known as the pyramid algorithm. UHM¿ which i'll describe later¿ °when i talk about uh wavelets uh in the in the application sense.° UHM¿ the (bolitic) scheme is in fact not uhm this method, °but uh quite different. uhm and the ( ) and is one of the things that is better.° uhm¿ and i'll finally leave the introduction with an example¿.....

In this example Andrew finishes a section, during which he walks back to the overhead projector. He then pauses for 2 seconds, says *uhm* in a louder voice with rising intonation (arrow 1), moves the slide up and pauses for a further 2.5 seconds. This first *uhm* is being used to indicate that a new section is about to commence. It marks the fact that the presenter is between sections and that more talk is about to come. However no talk ensues. After the pause, the presenter gives a dental click, says a louder *okay* with falling intonation, followed by a quieter *uhm* with no intonation contour (arrow 2). He then talks about the topic of the slide, *the traditional method of uhm (.) wavelet transform is known as the pyramid algorithm.* This second *uhm* in the example (arrow 2) could be replaced by *so*. However, whereas *so* marks the fact that an orientation is about to follow, *uhm* only indicates that there is more talk to come. In this sense it could be seen as being the weaker possibility. I mentioned before the possible reason for his reluctance to use the strong *okay so* composite as being due to his lack of status within the Division. It is important to note

[4] Interestingly, Roger, who also consistently uses *uhm* at the beginning of a section, only uses *so* in the same way. He never uses *so* at the beginning of a section.

that even though this presenter has chosen to substitute *uhm* for *so*, this does not mean that they have the same semantic content, nor does it mean that they have the same function.

This analysis has examined the occurrence of *uhm* following *okay*. The data indicates that there are two different ways in which this can occur. The most common way is following an interruption or laughter, with *okay* initially closing off the interlude, followed by *uhm* plus a pause, before the new section is commenced. Alternatively, one presenter uses *uhm* following *okay* as a substitute for the stronger *so*. In both situations, *uhm* has the same function, that of indicating there is more talk to come. Therefore, for *uhm* to follow *okay*, accords with the analysis of the individual functions of both *uhm* and *okay*.

4.2.5.2 *uhm okay* combination at the beginning of a section

The previous analysis would seem to suggest that the *uhm okay* combination is unlikely. In fact there are only 2 examples of this combination at the beginning of a section. They both come from the same presenter, Andrew, in close proximity to each other (Example 15).

Example 15
[Ar:2]

Pres: .....so in fact this is uhm quite good¿ uh what multiple you've got before that n¿ °uhm° <depends on the wavelet¿> °so a complex uhm wavelet¿ will in fact require an order of something big times n¿°

(1.5)

(1) → Pres: **U:: H [M¿** (1.0) t! **OKAY.** THE OTHER ONE IS uh sparcity¿ (.)=
Action: [moves slide up

Pres: =UHM::¿ that issue is about basically (.) uhm how few co-efficients uhm you can represent in simple¿ uh in signal¿ uh data, and uh °sparcity is good because it <means that you have represented your entire signal, in very few uhm co-efficients¿>° (.) the wavelets in fact can be (projecting)¿ °uhm¿ <which is based on the cosine transform¿ so it's a relative (gregorian) transform.>° (2.0) .h UHM¿ AND SO the better the velocity can pressure¿ (2.0) UHM::¿ what happens when you compress the signal. (1.0) uhm¿ is that you basically take the transform be it a cosine¿ or wavelet¿ and then store °<<those coefficients or send those coefficients.>>° (1.5) UHM¿ and of course. the wavelet that you press is better, 'cos almost all of the information is contained in very few co-efficients. (2.0) ((moves slide up)) UHM¿ and finally- or another application, sorry. is noise removal¿ (1.0) UHM¿ this is in fact related to the sparcity issue. (1.0) ((moves slide up)) UHM¿ because the essential signal in the wavelet domain, is represented in so few coefficients. (1.0) UHM¿ whereas noise is spread °uhm° over very many small co-efficients. if you cut out all the small coefficients, (1.5) UHM¿ ((moves slide up)) you uh in fact get uh a very uhm (.) good denoised image. UHM¿ the advantage of the wavelets is that they don't merge sharp edges. and so if you've got for instance ((goes to blackboard))

a nuclear magnetic resonance in ( ) °sort of like this, (2.0) ((writes on blackboard)) and you use traditional ( ) methods to get that, ( ) whereas uhm the wavelets won't ((walking back to OHP)) in fact do that.°

(2.0)

(2) → Pres: **U::HM:** [:¿ (2.5)=
Action: [moves slide up

(3) → Pres: =t! **OKAY. uhm** the traditional method of uhm (.) wavelet transform is known as the pyramid algorithm. UHM¿ which i'll describe later¿ °when i talk about uh wavelets uh in the in the application sense.° UHM¿ the (bolitic) scheme is in fact not uhm this method, °but uh quite different. uhm and the ( ) and is one of the things that is better.° uhm¿ and i'll finally leave the introduction with an example¿.....

Andrew, like Roger, uses *uhm* to mark a new section, although unlike Roger, he seldom uses *uhm* alone in this position. The above example (Example 15) shows how Andrew uses *uhm* at the beginning of a section in combination with *okay*. We have already looked at the situation at arrow 2 (Example 14), where Andrew uses the louder *uhm* to mark the beginning of a new section, followed by a further *okay* marker (arrow 3). As can be seen from Example 15 he does a similar thing at arrow 1. These are the only times this combination occurs. It is not clear why he wants to say there is more talk to come, marked by the louder *uhm*, and then say a louder *okay* with falling intonation. The only thing that can be said is that this $okay_2$, which has the double function of closing off and indicating readiness to move onto the next bit, is clearly in this example placing the emphasis on the topic-shift aspect. In that sense it strengthens the previous argument that the $okay_2$ plays a double function.

4.2.5.3 *uhm so* combination at the beginning of a section

The most frequent combination involving *uhm* at the beginning of a section is *uhm so*. Mark uses the combination *uhm so* at the beginning of a section most frequently, although other presenters sometimes use it at the end of a section. The following example shows how Mark uses this combination (Example 16).

Example 16
[Ma:9]

Pres: ..... this ((points to OHP)) sequence of colour uh it sort of °disappears as well. but.° ↑so there's (.) there's ordering¿↓ there's something about zeros¿ maybe we could fill ((takes slide off)) that in.

(1) → Pres: (1.0) **[uhm¿** [(1.5) [(1.0)=
Action: [puts slide onto pile [picks up new slide [puts new slide onto OHP

(2) → Pres: =t! ↑**so what happens if we've got a space like this¿** which has got a zero in the middle¿↓ sort of sign¿ and you get that ((points to OHP)) from subjective survey data maybe, or difference model¿ .....

In this example, the previous topic is resolved, there is a 1 second pause, the presenter says *uhm* with rising intonation (arrow 1) while putting the old slide on the pile. He then pauses for 2.5 seconds during which he picks up the new slide and puts it on the overhead projector. There is then a dental click followed by *so what happens if we've got a space like this¿* with raised pitch (arrow 2).

This combination is in keeping with the role and function of the individual markers, *uhm* and *so*. *Uhm* is indicating that more talk is about to come, and, as with previous presenters, is surrounded by pauses and is said with rising intonation. *So* then marks the start of the orientation, as to what the next section is about. In this case, the orientation is in the form of a rhetorical question. Therefore, for *uhm* to precede *so*, is a possible combination, in keeping with the functions of both *uhm* and *so*.

4.2.5.4 *so uhm* combination at the beginning of a section

The previous discussion, arguing for the possibility of *so* following *uhm,* would seem to indicate that the combination *so uhm* was not a possibility. Such reasoning accords with the data. There is only one example of *uhm* following *so,* and in the example *so* is being used in its resultative sense, rather than as a discourse marker (Example 17). When *so* is used at the beginning of a section it usually functions as a discourse marker, orienting the audience to the topic of the section. This example is quite different.

Example 17
[Ro:10]

..... whether we like it or not, it seems that p-c platform is is the most popular platform for for web based applications. °and it appears that° all ((both hands up and down in air)) the new product launches come out on the p-c first, and the other other platforms like macintosh¿ °and unix boxes¿ seem to follow.°

(2.0)
→ ↑**SO** (1.0) **uhm¿** FOR HANDLING ((left hand in air)) G-I-S DATA AT-T THE CLIENT END↓ we were faced with this desision do we want a java applet¿ or use a plugin. plugins i said were great, for performance reasons. and we seriously considered writing a plugin¿ .....

Here Roger is talking about how they made their decision as to what platform should be used. In this example we can see how he finishes the section by talking about the pc

platform, pauses 2 seconds, then continues his argument with *SO¿ (1.0) uhm¿ FOR HANDLING G-I-S DATA AT-T THE CLIENT END* said in a louder voice and with raised pitch (arrow). Although this mimics what occurs at the beginning of a section, it is in fact not functioning in that way. Firstly, this presenter nearly always uses *uhm* as the first word of the section, whereas here *uhm* is clearly not functioning in that way and is not surrounded by pauses. Secondly, and unusually at the beginning of a section, *so* is being used in its resultative sense, rather than as a discourse marker.

It is important to clarify that the examples we are examining are only relating to possible combinations at the beginning of a section. Even though *so uhm* does not occur at the beginning of a section when *so* moves straight into the orientation phrase, it does in fact occur quite frequently within a section. Within a section, *so* is marking a parenthetical statement, marking the resolution, or even functioning in its resultative sense. In these cases, *so* is functioning differently, and *uhm* is functioning as a hesitation filler. The combination is usually followed by a pause.

So far we have looked at all the possible double combinations, *okay uhm, uhm okay, uhm so* and *so uhm*, and analysed their individual functions within the different combinations. Although all four combinations exist in the data, only *okay uhm* and *uhm so* are typical possibilities at the beginning of a section. If the other combinations occur, they are not being used as discourse markers. Combinations of all three markers also exist in the data, although there are very few examples, and the following analysis will ascertain how they function at the beginning of a section.

4.2.5.5 *okay uhm so* combination at the beginning of a section

The combination, *okay uhm so* would appear to be possible, because *uhm* following *okay*, yet preceding *so* is in keeping with the analysis of all three discourse markers. *Okay* plays the double function of closing off and indicating readiness to start the next bit. In the following examples, the *okay* is generally of the first type, with the emphasis on the closing off aspect. There are no examples of a $okay_2$ in this combination, where *okay* is said with a louder, raised pitch voice. This is to be expected. *Uhm* then indicates that there is more to come; that the presenter is between bits. *So* indicates that the next bit is happening, by orienting the audience to what the new topic will be about before it actually commences.

The first example shows how the three markers can occur in combination (Example 18).

Example 18
[Mi:3]

Pres: .... °so ((lifts hand into air)) they're the acknowledgements.° and also there's a few scientists along the way¿ mr benooly¿ an' mr boyle¿ an' mr newton¿ who helped as well¿

Pres: (2.0) [(0.8)
Action: [clicks on mouse - new image

(1) → Pres: **okha:y.** ((breathy)) [(1.5) =
Action: [looks up at audience and then back at computer

(2) → Pres: **=uhm¿ SO** WHAT AM I GOING TO TALK ABOUT, ((moves away from the computer and looks towards large screen)) well¿ (.) i'll sort of start at the first bit. ↑what is a pet rocket?↓ <uhm i'll go back to that in a moment,> uhm¿ ↑i'm going to show you a video, of uhm a launch¿ and a flight¿ 'cos it's quite interesting¿↓ we look at it full speed¿ <and then look at it frame by frame¿> (.) ↑then we get into the heavy bit¿ uhm i actually want to look at the mathematics trying to model what a p-e-t rocket does¿

In this example, the presenter has just finished his acknowledgements and is about to tell the audience what he is going to talk about. He pauses for 2 seconds, then clicks on the mouse to give a new image on the screen and says a breathy elongated *okay* (arrow 1). He then pauses again for 1.5 seconds, during which he looks up at the audience, says *uhm* with rising intonation (arrow 2) followed immediately by *SO WHAT AM I GOING TO TALK ABOUT.* It is clear that the *okay* is of the first type, in that it is clearly playing a closing off role. It is said with falling intonation and is followed by a pause. Therefore there is no conflict in terms of an overlap of functions.

In the second example (Example 19), it is also clear that there is no overlap of functions between the three markers.

Example 19
[Ph:7]

Pres: ..... uhm¿ (.) it's (.) we've actually got there's a couple of studies that show that for the important things like uh flo:w rates, and petrol consumption in particular, constant acceleration models actually do give a fairly good approximation to a »proper uh smooth acceleration °model.°

(1) → Pres: (1.5) [(1.0) [(1.0) [.h **°okay.°** (1.5)=
Action: [presses mouse
Screen: [new image

(2) → Pres: =↑**uhm¿ so** the (.) the heart of the car-following algorithm, is uhm the headway uh the speed head↓ sorry¿ (.) the >speed distance,< or the speed headway, uhm relationship. so this says, ↑at my current speed, what is what distance should i be holding↓ uh to the car in front.....

This example shows how *okay* is also playing a closing off role, in that it is surrounded by pauses and is said more quietly than the following talk (arrow 1). The new section commences with *uhm*, followed by *so*, and is said with raised pitch (arrow 2). However, although the beginning of this section looks like other sections, in fact the *so* statement is a resultative statement, following on from what has already been said, rather than a launch of a new topic. Therefore in this example, *so* is in fact not functioning as a discourse marker.

In the third example (Example 20), the situation is different yet again.

Example 20
[Ar:1]

Pres: °oka:y.° uhm my talk is uh wavelets by emission ( )¿ however¿ there is a plan of attack¿ (.) uhm¿ (.) first i'm going to just talk about the (bolitic) scheme in general terms¿ set algorithms¿ uhm (.) and uhm (.) output quality or whatever¿

→ (0.8) **okay¿ uhm¿** so we've got the introduction¿ which uh what wavelets are¿ and what useful properties they've got¿ uhm then i'll move onto algorithms¿ (.) uhm¿ and then finally I'll play uh the soft (tone of long tone of) various uhm images and signals¿ and see what they do.

This example is quite different in that the three markers do not occur at a boundary with new slides being changed. The presenter has just started his talk by briefly outlining the topic. He then pauses for 0.8 second before saying *okay* with rising intonation (arrow). This is quite different to how *okay* is normally said at the boundary, where it always occurs with falling intonation in keeping with its closing off role. In this case, Andrew is checking with the audience before moving on to outline the structure of his talk.

The above three extracts (Examples 18, 19, 20) are the only examples of where the combination *okay, uhm* and *so* co-occur. It is clear from the analysis that the three markers have quite distinct functions and are not interchangeable.

4.2.5.6 *okay so uhm* combination at the beginning of a section

Based on the previous analysis, the combination *okay so uhm* would seem to be unlikely, as is the case. There are only 2 examples of this combination, both from the same presenter (Example 21).

Example 21
[Ph:8]

..... they actually want you to slow down. ((laughter)) so that on average »the people going through, are going through at °forty kilometers an hour.° so, (1.0) that's ((flops hands in air)) kind °of interesting.°

(2.5) ((presses mouse - new image))
(2.0) ((cough)) (0.8)
(1) → **okay. so uhm¿** (1.5) that's:: (1.5) the the reason why we've been doing, or the reason that <<i've been doing is is all been on this uh this uhm>> vehicle uhm the car-following model. and »like a lot of (.) <<discrete event simulations there there's (.) so many interactions betweens all the different cars, ((flops hands in air)) it °took a while to get it going. anyway.°>>

(0.5)
(2) → **uhm¿** ((vaguely points at screen)) what other people have been working on, uhm¿ have been uh right of way rules.....

It is clear that in this example *uhm* (arrow 1) is connected with a false start. It is followed by a 1.5 second pause, an elongated word, another pause, then an incomplete sentence, which is subsequently ammended. Therefore in this case *uhm* is not playing the function of marker, rather it is part of a repair routine. The presenter chooses to fairly quickly close off the awkward beginning of the section, by giving a brief summary of what was said previously. He then recommences the section at arrow 2.

This is in keeping with our analysis of the function of *uhm* at the beginning of a section. If *uhm* were acting as a discourse marker, we would not expect to find it following *so*. However, because *uhm* in this example is part of a repair routine, it is functioning quite differently to *uhm* as discourse marker, and therefore accords with the analysis to date.

However, the only other example, from the same presenter is slightly more puzzling (Example 22).

Example 22
[Ph:1]

→ ((claps hands on legs)) **okay. so uhm¿** (0.8) thanks for coming¿ .h this talk is turning into a mult-media nightmare. hh ((laughter)) .h uhm¿ (0.8) i've already got, as you can ↓ see¿ one¿ two boxes on the desk, that i was going to be flipping through. .h i couldn't transfer files from one system to another¿ so we've got (1.0) uhm hard copy o-h-p's as well¿ we've got- uh the whole thing is being put onto celluloid¿ uhm¿ (1.0) so and and i haven't had a chance to uhm run through the final, hh ((laugh)) run through. .hh because i've spent all morning trying to get this box to work. so my apologies if it sounds a little bit °uhm¿° ↑ a little bit haywire.
(2.5)

This example is from the start of the presentation (arrow), where the presenter claps his hands on his legs, says *okay* with falling intonation, followed by *so*, followed by *uhm*

with rising intonation, followed by a short pause of 0.8 seconds, before saying *thanks for coming*. This example is initially puzzling because according to the above analysis of the three different discourse markers, such a combination is not possible. This is because we expect *so* at the beginning of a section to be followed by an orientation phrase. However, in this example, *so* is not functioning in that orientation role. Here *so* is followed by an appreciation, something which would normally occur at the end of a section.

Therefore, although the *okay so* composite looks like the *okay so* composite that occurs at the beginning of a section, it is in fact not functioning in that role. *Okay* is marking the closing off of the pre-seminar talk and indicating topic shift. *So uhm* is marking an appreciation, something not normally encountered at the beginning of a section. We will see later that *so uhm* is quite a common way of resolving a section. Therefore, once again, there is no conflict in terms of the functions of the individual markers, *okay, so* and *uhm.*

4.2.5.7 *uhm okay so* combination at the beginning of a section

According to our analysis, the final combination of discourse markers, *uhm okay so*, should also not be evident in seminar talk. There is only one example of this combination (Example 23).

Example 23
[Mi:13]

	Aud:	what are your axis or co-ordinates ( )?=
	Pres:	=okay. this ((points to screen)) one here is pressure¿ in kilopascals¿ and this ((points to screen)) one over here is time¿ in essentially uhm miliseconds sorry seconds times ten to the minus three. so this is point one ((points to screen)) of a second¿ point two ((points to screen)) of a second¿ point three ((points to screen)) of a second. ↑now one of the interesting things is that, for most of the rockets you'll see in the video, the water is expelled within about 40 to 50 miliseconds.↓ <that's really a very short period of time indeed.> and as you'll see later¿ this induces »quite extraordinary accelerations in the rocket. (.) of the order of ten¿ and twenty gravities. (.) which is quite outside most people's experience. uhm¿ so °that's ((circles solutions on screen)) that's the [solutions there.° (2.0)=
	Action:	[starts to walk back to computer
(1) →	Pres:	=°°**uhm**°° [(1.0)=
	Action:	[clicks on mouse - new image
(2) →	Pres:	=↑**oka::y¿** so now we know about the behaviour of the pressure¿ in the bottle¿ (.) and we know how to turn pressure into the velocity of water. we now have to turn it into thrust.....

It is clear from this example that once again there is no conflict in terms of overlap of functions between the three markers. The presenter finishes the previous section and pauses for 2.0 seconds, during which he walks back to the computer. He then says a quiet *uhm* (arrow 1), and clicks on the mouse to give a new image on the screen. Then with raised pitch he says *okay* (arrow 2), with rising intonation and tells the audience what they have just worked through, *so now we know about the behaviour of the pressure¿* In this example, the *uhm* is not a marker, rather it is a filler, in connection with the presenter walking back to the computer. In addition, *okay*, said with rising intonation, is not closing off the previous bit, rather it is checking whether the audience is following. This is probably in connection with the previous interruption.

The above analysis of the different combinations of the three discourse markers confirms the analysis of the individual markers. Each marker functions in a specific way whether it occurs alone or in combination. The expected combinations of *okay* preceding *uhm*, and followed by *so* is what occurs. The analysis shows that any instances of other combinations are only possible because not all three words are functioning as discourse markers in that position.

4.2.6 What does all this mean for *uhm* at the beginning of a section?

One important aspect that has not been covered is what actually happens when *uhm* is said, because it looks as if it is associated with the presenter doing something with the overhead slides. In Chapter 2, it was shown that *okay* is associated with either taking the slide off, putting it on the pile or picking the new slide up. It did not seem to be associated with putting the new slide on the overhead projector. It was important that the minimum action, taking the old slide of the projector was done before *okay* was said. No more could be determined at that stage, such as, for example, whether *okay* is more closely associated with taking the old slide off rather than putting the new slide down. This is because sometimes all four things happen during the pause, before *okay* is said, as in the following example (Example 24).

Example 24
[Ma:14]

.... »a group is something with (.) the signature of a multiplicative group with an inverse¿ and it's also a monoloid¿ that has an inverse. and this is what a monoloid is. and °so on. and so on.° and so they all sort of uh sort of °chain together.°

(6.5) ((takes slide off, puts on pile and puts new slide on OHP. title: "Naturals"))

→ khh:: ↑**OKAY. SO HERE'S ANOTHER EXAMPLE¿** and this is a sort of constructive theory¿↓ rather than <those which were sort of defining properties.> this one says it's a particular set we might be interested in¿.....

This example shows how the presenter does all four actions during the 6.5 second pause. He then commences the section with the composite *okay so* (arrow). The minimum therefore, of *okay* being said after the old slide has been removed, has occurred. However, without the analysis of *uhm,* more than the minimum could not be argued for.

Examination of *uhm* has shown that *uhm* is also associated with interacting with the overhead slides. There are plenty of examples in the data of *uhm* being associated with putting the new slide on the projector (see Examples 1, 7, 8, 12, 13). The following example illustrates this connection (Example 25).

Example 25
[Ma:6]

..... so: the user sees the structure, which is two (.) two ((points to OHP)) surfaces. (main) »and that's obviously ((takes off slide)) °<different from the display ((puts slide onto pile)) structure.>°

→ (1.5) .h **uhm::¿** ((puts new slide on OHP))
(1.5)
t! so here's a sort of 3-d example, uh this is ay ((points to OHP)) uh a sort of fluid flow probe¿ which you use in digitilisation insertion. and it sort of bends and twists according to uh the fluid flow. .....

This clearly looks as if *uhm* is associated with putting the new slide on the overhead projector. If this is the case, and *uhm* is actually marking the new slide being put on the projector, *okay* could simply be marking the taking off of the old slide. This would make sense in terms of *okay* playing a closing off role. This also fits in with a large number of examples where *okay* is clearly not associated with putting the slide on the overhead projector (Example 26).

Example 26
[Ma:14]

Pres: ..... and it just happens to be the case, that here, that »the sorts and the operators have the same names, so that's how it matches them up. °though there are more complicated ways of (.) of doing matching.°

→ Pres: [(4.0) t! ↑**OKA** [**Y. SO::** [(2.5) [if your education was anything=
Action: [takes slide off [puts onto pile [(picks up new slide [puts slide on OHP

Pres: =like mi::ne¿ u:h when you learnt about algebra, you might have done some some group theory¿↓ (2.0) uhm (2.5) khh and here's some ((coughs)) t! some some basic ideas from there¿.....

In this example the slide is taken off during the 4 second pause. As the presenter says *okay* with falling intonation, the slide is put on the pile (arrow). The new slide is then picked up and put on the projector as the first word of the new topic is said. In this case it is clear that the *okay* is marking the first part of the interaction with the slides, that of taking it off and putting it on the pile.

Uhm can also be associated with creating a new image by clicking on the mouse (Example 27). However, this is less clear, because there is only one action and this one action can also be marked by *okay* (see also Examples 6, 11, 18, 23)

Example 27
[Mi:24]

	Pres:	.....↑but even so though,↓ i was a bit disappointed. that it was a bit under. the errors are sort of °you know uhm° twenty -five¿ ((peers at screen)) thirty-eight¿ and thirty-one¿ percent. so that's something for everyone to puzzle over, (.) ↑why is this so.↓ °harry miller. what's his name¿ julias summer miller.°
	Aud:	( )
	Pres:	(1.0) [(0.5)=
	Action:	[new image
→	Pres:	**=uhm¿** (1.0) ↑the second thing i did is, i i measured, i measured this sort of photograph here,↓ ((holds up photograph)) (.) uhm¿ and again i i compared it to actual actual flight¿ .....

Here the presenter pauses and clicks on the mouse to create a new image. He then says *uhm* with rising intonation, pauses again, before moving onto the new topic.

It has to be stressed that these are only tendencies, although it seems to confirm the analysis that *okay* is generally associated with the first part of the process, that of taking the old slide off and *uhm* is generally associated with the second part of the process, that of picking up the new slide and putting it on the overhead projector. However it can only be a tendency, because there are examples of *uhm* associated with putting the old slide on the pile (Example 16). Sometimes if there is no slide to be changed, some presenters will adjust the slide when *uhm* is said (Example 8, 14, 15). Alternatively, Roger says *uhm* while simply looking at, or possibly reading, the overhead slide (Example 4).

4.2.7. Summary

The above analysis indicates that there are two distinct ways in which *uhm* can function at the beginning of a section. Either it can function as a filler, associated with the presenter

filling in a pause while he does something such as walk across the room (Example 23). When *uhm* is used in this way it is said more quietly than surrounding talk and in fact there are very few examples of it occurring in this position.

Alternatively, and more interestingly, at the beginning of a section, *uhm* can function in a much stronger way. This *uhm* is generally said more loudly than surrounding talk or is said with raised pitch normally associated with the start of a section. Although this louder *uhm* also seems to be associated with the presenter doing something, in that it is associated with putting the new slide onto the overhead projector, it does not behave as a filler while the presenter decides what he wants to say next, nor is it being used as part of a repair sequence. This is clear because the occurrence of *uhm* is systematic. If it were simply a filler or a repair device, its occurence could be anywhere, depending upon the need. This is not the case. The position of this *uhm* at the beginning of a section and the environment in which it occurs indicates that it is playing a specific function within seminar talk.

Unlike *okay* and *so*, *uhm* does not have any semantic content. The analysis has shown that the function of *uhm* is simply to indicate that the presenter is between bits; that there is more talk to come. In keeping with this function, *uhm* in this position is always said with rising intonation, indicating that the talk is continuing. In addition, the intake of breath and the dental click, often heard at the beginning of talk, can occur either before or after the *uhm*. This also fits with the function of *uhm*, that of showing that there is more talk to come.

In this sense *uhm* is a marker, just like *okay* and *so*, and as such provides information to the audience as to the overall macrostructure of the talk. We have seen that although *uhm* occurs in a similar environment to *okay* and *so*, it cannot be replaced by them, except when *uhm* is used instead of *so*. Its function is different, and presenters generally make a choice as to which marker they will use at the beginning of a section. By choosing to use *uhm* as a marker, the presenters are conveying a particular message to the audience, a message which is quite different to that conveyed by the other discourse markers, *okay* and *so*. In some ways *uhm* could be seen as a weaker marker, in that the message is weaker, and the following orientation is more limited than is the case for *so*. When occurring as the main, or in some cases only marker, *uhm* is generally said louder than surrounding talk and sometimes with raised pitch. *Uhm* can occur in combination with the other markers, but this is less usual. We saw that when the markers do occur in combination, their individual functions remain separate. Examination of the different possible combinations of all three markers confirms the analysis of the function of *okay, so* and *uhm*.

4.3 *Uhm* or *uh* within a section

The previous discussion dealt with how *uhm* can function as a discourse marker at the beginning of a section, often associated with putting a new slide on the overhead projector. The following discussion analyses how *uhm* functions within a section.

Uhm is quite complicated to analyse in that it is a frequently used word within seminar talk, and is generally assumed to be associated with dysfluencies and uncertainties in the presentation. The following analysis demonstrates that to simply associate *uhm* or *uh* with dysfluencies of speech production is to overlook its multilevel function, because *uhm* or *uh* can be used in a number of ways and on a number of levels. The previous discussion demonstrated how it functions at the beginning of a section. Either it functions as a discourse marker to indicate that there is more talk to come or, less commonly, as private talk in the form of a filler. As a discourse marker, *uhm* is often associated with interacting with the overhead slide or computer image. A similar pattern emerges when *uhm* is examined within a section.

Discourse markers at the beginning of a section are important indicators of the macrostructure of the talk as a whole. Within a section, they can be used to indicate more detailed sentence level structure. This is why *uhm* and *uh* are interesting, in that they mark structure both at the macro and the microlevel. At the beginning of a section they indicate the macrostructure of a talk, yet within a section they indicate the more detailed microstructure by marking main points on, for example, an overhead slide, by marking tone units, and by marking technical terms (Table 2).

Presenters	Distribution of *uhm* in Seminar Talk					
	uhm **(total)**	***uhm*** **at beginning of a section**	***uhm*** **marking a new point**	***uhm*** **before a unit of talk**	***uhm*** **before noun**	***uhm*** **as repair or hesitation**
Mark	434	18	142	175	56	43
Mitchell	293	16	142	93	31	11
Andrew	412	23	178	142	49	20
Paul	653	15	130	193	153	162
Oswald	272	19	40	118	42	54
Roger	213	19	79	65	48	10

Table 2: *Number of times* uhm (or uh) *is used at different levels of discourse for the 6 presenters*

Table 2 demonstrates how frequently *uhm* and *uh* occur within seminar talk, yet the following analysis will show that its occurrences are not random. Initially, an examination will be made of how *uhm* or *uh* function as repair devices or as hesitation fillers within talk. This will then be contrasted with the way in which *uhm* or *uh* function as discourse markers at a number of different levels within the discourse.

4.3.1 *Uhm* and *uh* as repair devices and hesitation fillers

There are many examples of *uhm* and *uh* being used as hesitation fillers or repair devices. Such instances are recognizable by obvious uncertainties and dysfluencies of speech production in the form of cut-offs, sound stretches, pauses, repetition of words or syllables.

The following example shows how *uhm* can occur as part of a repair routine, as evidenced by repetition of words (Example 28).

Example 28
[Ph:2]

..... .h ↑we send down,↓ uhm to the scats box¿ ↑uhm¿ (2.0) exactly the information↓ that that box would use on the street. and that information is uhm¿ ↑how much time,↓ in the last hundred in in the last second¿ there was a ↑car on the detector.↓ uhm¿ the the little uhm (.) ↓ <rectangles
→ that sit in front of uh the stop lines, **in uhm uh on the on the street**. uhm have a little metal detector underneath it. and that's that's the only information that uh scats uses. uh to detect how much traffic is flowing. >↑ uhm¿ so we send down the uhm volume¿ that is how many uh cars have crossed¿ and uh how much time this uh those

In this example, Paul says the wrong preposition (arrow). He then initiates a repair sequence by saying *uhm* followed by *uh* before he repairs the preposition by saying *on the* followed by the correct phrase, *on the street.* This is a clear example of how *uhm* and *uh* are used to initiate a repair routine. It occurs in the middle of a unit of talk, with no specific prosodic features. Volume and pitch remain constant and intonation is level, rather than rising. As part of the repair routine, both *uhm* and *uh* seem to be used interchangeably.

The repair can also be evidenced by a cut-off (Example 29).

Example 29
[Ph:5]

.....uh in sydney there's uh a room¿↓ where uh a (1.0) uhm about a dozen operators sit and look at the traffic, and when scats isn't doing uh quite as well as it might be doing, they jump in and

→ manually uh change things, .h uhm¿ **but (.) wor- uh traffic is** an incredibly complicated thing, and it's just as easy to fowl something up, by ↓ interfering with it manually. as it is to fix the problem. ↑ <in fact it's a lot easier hh ((laugh)) to patch things up.> .hh and so.....

In this example, the presenter changes his mind about a particular word (arrow). He cuts the word short and then initiates a repair sequence with *uh* followed straight away by the corrected version, *traffic is an incredibly complicated thing.*

The repair can also be evidenced by stuttering (Example 30).

Example 30
[Ma:8]

.....and you can't generate a new ((points to OHP)) scene in response to new input. <°data that
→ you haven't seen before.°> and so **(.) uhm (.) .h y-you get (.) uh (.) you can't generate scenes,** new scenes. uhm and you can sort of bend this a little to start »widening the frames of each of the scenes, but <°then you end up sort of back here.°> ((points to top of OHP))

The presenter initially indicates uncertainy (arrow) by the presence of a pause, followed by *uhm* and another pause. He then breathes in, but is still unable to formulate a repaired version. It is only following a further pause that the repair, initiated by *uh,* is successful.

Sometimes repair is evidenced by pauses, when the presenter is uncertain about how to continue. In this example the repair is finished by the presenter saying *yeah* (Example 31).

Example 31
[Ar:8]

..... so that small uhm discontinuities but large big flat bits where you can cut out a lot of uhm white noise or whatever. (1.5) UHM¿ and that's another one where we
→ shift the average wavelet coefficients and that also helps, **°but uhm (.) yeah. (.)** ((takes slide off)) i didn't ((puts slide on pile)) use that°.

Here Andrew starts a new idea with *but,* however he does not complete the idea. He then says *uhm,* followed by a pause, then instead of finishing it, he says *yeah* with falling intonation, pauses again, then starts a new sentence to finish the section.

Repair can also be evidenced by sound stretches or elongation (Example 32). As in the previous example, the repair sequence is acknowledged by the presenter saying *sorry.*

Example 32
[Mi:9]

..... but¿ as the water is pushed out the end the mass of the rocket is getting less and less,

→ **s o::, uhm the uh the acceleration, sorry.** <the weight of the rocket is falling, and the gravity force drops.> ↑<so it's quite an interesting little system of things going up and down.>↓ (.) uhm¿ so that's the water thrust phase.

In this example, the presenter indicates uncertainty by saying an elongated *so::* (arrow). An unsuccessful repair is initiated by *uhm*, then a further unsuccessful repair is initiated by *uh*, before he eventually says *sorry* with falling intonation, and says what he actually wants to say a bit faster than surrounding talk, *the weight of the rocket is falling, and the gravity force drops.*

The following example shows how *uhm* can also occur as a hesitation filler while the presenter looks at the screen (Example 33).

Example 33
[Ph:1]

.... very clo:se approximation. of what real cars do on the road, in reaction to what other cars are doing. on the road. uhm¿ this contrasts with the macro model¿ which is uh uhm a higher level¿
→ faster uh simulation¿ and that's just an aggregate behaviour. so: **u:hm (.) ((looks at screen)) uh it's it's a <a grosser approximation.>** (2.0) uhm¿ ((vaguely points)) one of the main features of the the titram system, is that it connects to the sca::ts uhm traffic control system. uhm¿ scats is, uh i (.) ↓ sort of <<i sing it's praises every time i i give this talk. but i'm still a bit amazed about it. ↑>> uh¿ it's uhm technology developed in in sydney. <getting a little bit long in the tooth now¿> uhm¿ and uh about to be redeveloped. .h uh¿ but it's a traffic control system, that adapts uh to the way the traffic is

This example shows how the presenter is about to conclude this idea with a summarizing comment about the macromodel. He says an elongated *so::* (arrow), followed by *uhm*, followed by a pause while he looks at the screen. Then he commences the repair routine with *uh*, followed by repetition of *it's it's a*, before he eventually says what he wants to say with faster talk. In this case, *uhm* seems to be acting as a filler while he works out what he wants to say. As a hesitation filler it is saying, *I'm meant to be talking, but am unable to do so at the moment. Uhm* and *uh* are commonly used in this way, and often follow, *but, so, and,* or *then.*

The above examples (Examples 28-32) demonstrate how both *uhm* and *uh* are involved in repair or as hesitation filler (Example 33). Such *uhms* and *uhs* are quite distinctive in that they are connected with uncertainties and dysfluencies of speech production and are often associated with pauses. The presenter has to in some way deal with the break in the normal flow of talk before he can proceed. *Uhm* and *uh* seem to be interchangeable in this context and can co-occur within the same repair sequence. They are generally not said with rising intonation. As will be demonstrated in the following discussion, repair or filler *uhms* and

uhs are quite different from *uhms* which are external to the sentence or unit of talk, and which are clearly unconnected with typical repair indicators.

4.3.2 *Uhm* marking the beginning of a new unit of talk

The following example shows the frequency with which *uhm* can occur throughout a section, at the beginning of a unit of talk (Example 34). A unit of talk (Schiffrin 1987: 33-35) includes propositions, speech acts, sentences, or tone units.[5]

Example 34
[Ph:16]

(1) → ...**uhm** queue was kind of interesting, **uhm¿** (3.5) for uhm (.) there's (.) some (.)
(2) → reasonably big differences here. uh the the thing to remember though is **uh** that this is queue in meters. so a car uhm is is accounts f-for six meters. <so for instance on
(3) → this one here, **uhm** at the approach to two hundred, **uhm uhm** we predicted six
(4) → meters,> **uhm** cidra said **uh** nothing at a:ll. **uhm¿** basically there's there's, for all
(5) → intents and purposes, that's that's sufficient accuracy. **uhm¿** it means that uhm (.) uhm (.) °yeah.° (.) if you're going to uh build uhm uh for instance a lane to to if that's a a right hand turn lane¿ then you've got a °fairly good idea of how long tha- uh that lane should be.....

The above example has many instances of *uhm* and *uh*. Only those at the beginning of a unit of talk have been highlighted in bold (arrows). Other instances of *uhm* or *uh* (not in bold) are predominantly connected with repair sequences.

This is not an isolated example. *Uhm* or *uh* frequently occur before units of talk (see Table 2). In this position, *uhm* seems to mark the fact that another bit of information is about to come. Such talk is typical of spoken English, where the speaker adds clause after clause. This type of *uhm* is very different from the hesitation filler or repair *uhm*, in that it is not associated with other repair indicators. There are very few pauses. In the above example (Example 34) there are none at all. Occasionally there are repeated *uhms* as at arrow 3. Characteristically, *uhm* is preferred over *uh* in this position. Although *uhm* and *uh* are generally considered to be functionally equivalent, the following analysis will show that presenters have preferences for either *uhm* or *uh* in specific situations. One important difference is that *uh* is seldom said with rising intonation. This is important, because rising intonation seems to be used to indicate two things, both that there is more talk to come and that it is in some way important and should be taken note of. We saw that at the beginning

[5] I have chosen to follow Schiffrin (1987: 33-35) in referring to propositions, speech acts, sentences, or tone units as *units of talk*. This avoids the difficulty of delineation of the boundary of tone units or idea units.

of a section, *uhm* is said with rising intonation. The subsequent analysis demonstrates that when *uhm* is used to mark a new point, it is generally said with rising intonation. When *uhm* is simply marking a new unit of talk, as in Example 34, it is generally not said with rising intonation.

4.3.3 *Uhm* marking new points

Probably one of the most important ways in which *uhm* is used within a section is at a sub-macro-level, to mark a new point (see Table 2). *Uhm* is frequently used to mark the first point of the section following the orientation; *uhm* is very commonly associated with new points being highlighted on the screen; *uhm* is often used when recounting an event. And finally, *uhm* may also occur at the end of a section.

a) *Uhm* frequently occurs near the beginning of a section, following the orientation, just before the start of the new topic (Example 35).

Example 35
[Ma:2]

.... maybe by the end¿ uhm °some of it (.) ((picks up sheet)) will've soaked into your subconsious.° ((puts sheet on pile))

(1.0)
°°uhm°°
(2.0)
.h ↑so ((puts new slide on OHP. title: "what's it for")) FIRST OF ALL, (1.5) uh
→ (1.5) what's it for¿ (1.5) .t! **uhm¿** (2.0) well really what it is, is a is a (.) uh:: (.) is an attempt to provide a mathematics for↓ information display. a descriptive mathematical language. (.) uhm¿ ↑but here are some of the things that (.) that a good model of some area should do¿↓ ((runs hand down list)) <and i'm hoping this one does¿>.....

In this example, the orientation is in the form of the rhetorical question (arrow), *so FIRST OF ALL, uh what's it for¿*. The presenter then pauses, gives a dental click, then says *uhm* with rising intonation (bold). This is then followed by a pause and the start of the new topic, which in this case is the answer posed by the question.

This position is probably the most frequent place where *uhm* occurs. It indicates to the audience that the new topic is about to commence. In this example (Example 35), it follows a dental click and is said with rising intonation. In this position, however, *uhm* generally does not receive the same level of prominence that we saw occurring when it is used at the beginning of a section. Although it is said with rising intonation, to indicate that more talk is to come and that it should be taken note of, it is generally not said more loudly than

surrounding talk. Because *uh* is seldom said with rising intonation, it seldom occurs in this position.

b) The following example illustrates the way in which *uhm* is used to indicate the next point on the overhead slide (Example 36).

Example 36
[Ro:1]

(2.5)
(1) → t! ↑**uhm¿** (1.0) ((stands and looks at OHT, hand on chin))
(2) → what i'll cover briefly↓ today¿ is just look at some of the g-i-s requirements that we
(3) → looked at. the g-i-s on the internet. **uhm¿** and then i'll look at some of the systems
(4) → that are currently available¿ (1.0) **uhm¿** (1.5) .t! then some of the formats¿ that you might be (.)
uh using if you're a developer. <°°uh looking at°° the way of developing °systems to deliver g-i-s
(5) → over the internet¿° or the web¿> (1.0) **uhm¿** ((looks at OHT)) some of those data types, one in
particular actually or one protocol ↓in particular that °we used for our work.° there's a couple of
(6) → them floating around.↑ none of which are comprehensive. °all that comprehensive.° ↑i'll look at
handling some of the g-i-s data requirements.↓ <uh at the client end.> given that the client's
basically a web browser. one of the popular web browsers that we know and love. ↑and then (1.5)
(7) → **uh** lastly¿↓ i'll have a look at a a couple (.) i'll show you hopefully a couple of our demos that
we've done. °in the last few months.°

(8.0) ((takes slide off and puts on pile. organises next slide))
.hh uhm¿ (2.0) ((stands and looks at OHT))

This example occurs near the beginning of the talk, after Roger has introduced his topic and told the audience the rationale behind his current research. At the beginning of the section, he pauses for 2.5 seconds, gives a dental click and says *uhm* with raised pitch and rising intonation (arrow 1). He then pauses further, while looking at the slide with his hand on his chin (Figure 1). In this case, at the beginning of the section, *uhm* is marking the fact that there is more talk to come and accords with the previous analysis of *uhm.*

Figure 1: *Roger looking at the slide, entitled* Topics, *with hand on chin*

Roger proceeds to tell the audience what the various topics of his talk will be about. The slide has the title: *Topics*, followed by six items (Figure 1 and 2).

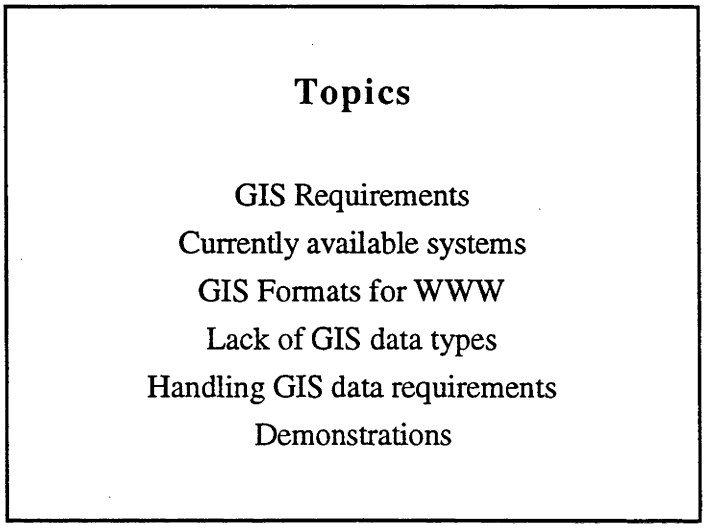

Figure 2: *Slide on overhead projector. Title:* Topics.

The slide itemizes the six topics that are going to be covered in the talk. All the topics on the slide are briefly discussed by the presenter. Arrows 2-7 in the example indicate where Roger moves to the next point on the slide. He indicates to the audience that he is moving onto the next point on the slide in two ways. Either he uses the discourse marker, *uhm* (arrow 3, 4, 5), or uses a more explicit phrase, for example, *what i'll cover briefly today is just look at...* (arrow 2) or *i'll look at ....* (arrow 6).

Uhm is generally the preferred marker in this position, although *uh* can also occur. It tends to be said with rising intonation, even when the more explicit marking is used[6] (arrow 7). We saw that rising intonation was one of the characteristics of *uhm* when functioning as a discourse marker at the beginning of a section. The same feature is occurring within a section. There seems to be a clear association between rising intonation and importance of the succeeding talk. It is also the characteristic intonation pattern used in English when listing things (Jefferson 1990). Each point of the list is said with rising intonation, with the final point being said with falling intonation. This contrasts with the repair or filler *uhm* which is characterised by no intonation contour.

[6] Presenters seems to follow a pattern, in that when there are more than about 5 points on the overhead slide, the latter points tend not marked by *uhm*.

This type of marking, associated with the points on the overhead slide, occurs most frequently near the beginning or at the end of a seminar. Within the talk, slides do not seem to so easily lend themselves to going through a number of points one by one. At the beginning of a seminar, presenters generally go through the outline of their seminar point by point. At the end of a seminar, presenters often summarize what has been dealt with in the presentation. The following example occurs at the beginning of a seminar (Example 37).

Example 37
[Mi:3]

(3.5) ((clicks on mouse - new image))
okha:y. ((breathy)) (1.5) ((looks up at audience and then back at computer)) **uhm¿** SO WHAT AM I GOING TO TALK ABOUT, ((moves away from the computer and looks towards large screen)) well¿ (.) i'll sort of start at the first bit. ↑what is a pet rocket?↓ <uhm i'll go back to that in a
(1) → moment,> **uhm¿** ↑i'm going to show you a video, of uhm a launch¿ and a flight¿ 'cos it's quite interesting¿↓ we look at it full speed¿ <and then look at it frame by frame¿> (.) ↑then we get into
(2) → the heavy bit¿ **uhm** i actually want to look at the mathematics trying to model what a p-e-t
(3) → rocket does¿ uhm as it flies¿ **uhm¿** and then i want to show you how i've gone about trying to verify what the model predicts.↓ <uh which is quite an interesting exercise in experimental
(4) → technology as well.> (.) ↑**and finally¿** <**uhm** i want to talk a little bit about> using the model to figure out what makes the best rocket.↓ °uhm° where best is not clear. **uhm¿** it might mean length of time in the air¿ it might mean height¿ it might mean maximum excitement¿ °who
(5) → knows.° **uhm¿** and ↑finally for those of you who haven't already seen one, we're going to do a launch of a rocket just ((points outside)) outside here¿↓ but we're not going to use water, we're just going to use compressed air. so it'll just go pop and go thirty or °forty feet in the air.°
(2.0)

In this example, the presenter once again uses *uhm* to mark each new point. As is now to be expected, the *uhms* are said with rising intonation, either on the *uhm* itself (arrow 1, 3, 5) or on the more explicit marking phrase (arrow 4). Although in this example, a direct comparison between the slide and the talk was not possible, because the overhead slide was not visible, it is still possible to generate the following slide from the data (Figure 3).

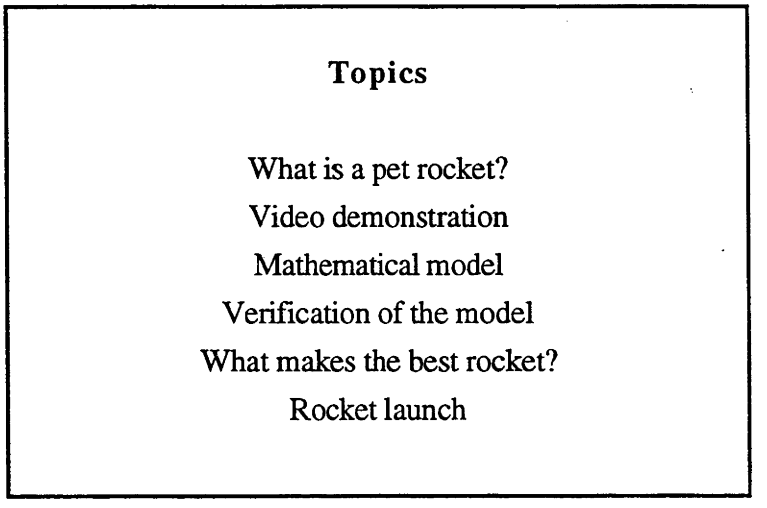

Figure 3: *Slide on overhead projector. Title:* Topics.

One presenter actually says these type of *uhms* a bit louder than surrounding talk and adjusts the slide, normally by moving it up, as he says *uhm* (Example 38).

Example 38
[Ar:2]

(2.0)
(1) → .h **UHM¿** AND SO the better ((points at OHP)) the velocity can pressure¿ (2.0) **UHM::¿** what happens when you compress the signal. (1.0) uhm¿ is that you basically ((points at OHP)) take the transform be it a cosine¿ or wavelet¿ and then store °<<those coefficients or send those
(2) → coefficients.>>° (1.5) **UHM¿** and of course. the wavelet ((points at OHP)) that you press is better,
(3) → 'cos almost all of the information is contained in very few co-efficients. (2.0) **UHM¿** ((moves slide up)) and finally- or another application, sorry. is noise removal¿ (1.0) **UHM¿** this is in fact
(4) → related to the sparcity issue. (1.0) **UHM¿** ((moves slide up)) because the essential signal in the
(5) → wavelet domain, is represented in so few coefficients. (1.0) **UHM¿** whereas noise is spread °uhm°
(6) → over very many small co-efficients. if you cut out all the small coefficients, (1.5) **UHM¿** ((moves
(7) → slide up)) you uh in fact get uh a very uhm (.) good denoised image. **UHM¿** the advantage of the wavelets is that they don't merge sharp edges. and so if you've got for instance ((goes to blackboard)) a nuclear magnetic resonance in ( ) °sort of like this, (2.0) ((writes on blackboard)) and you use traditional ( ) methods to get that, ( ) whereas uhm the wavelets won't ((walking back to OHP)) in fact do that.°
(2.0)

This example demonstrates how Andrew uses *uhm* very clearly to give prominence to the points on the overhead slide[7]. Once again this extract is near the beginning of the talk, where the presenter is still setting the scene for what he is going to talk about. The arrows show how he says *uhm* in a louder voice and with rising intonation. Often this is following a 1-2 second pause. Sometimes saying *uhm* is coordinated with moving the slide up (arrows 3, 4, 6). Coordinating the saying of *uhm* with the overhead slide in some way, seems to be a feature of this type of *uhm*. The presenter may actually move the slide up (as in Example 38), or just look at the slide (e.g. arrow 4 in Example 36), or simply point in the direction of the screen.

c) The following example illustrates the way in which *uhm* seems to function in a similar way when recounting an event (Example 39).

Example 39
[Ph:14]

(1) → **uhm** there are highways in japan, where platoons can get up to three hundred¿ or four hundred vehicles long. so that's three hundred vehicles a::ll travelling at exactly the right distance apart.

[7] In fact it was the way in which this presenter says *uhm* that made me realise that *uhm* was doing more than simply indicating repair or hesitation. His use of *uhm* is so characteristic, and in such well-defined environments, it became clear that it was functioning as a discourse marker.

(2) → **now** they were looking at one of these **uh** they actually set up a balloon¿ with a video camera.
(3) → **uhm¿** above a certain section of road,
(4) → **uhm¿** where they were getting accidents every now and again.
(5) → **uhm¿** and they couldn't understand why. <because it was a clear section of road.> what they
(6) → discovered was¿ **uhm¿** up the road, about another
(7) → **uhm** <it wasn't very far it was only five hundred meters,> there was a rise in the road, of three degrees. that lasted for a a couple of kilometers, and then it flattened out again.

In this example Paul is recounting how a platoon was investigated in Japan. Each aspect of the event is marked by an *uhm*, again said with rising intonation (arrows 1-6). It could be argued that these are similar to the way in which *uhm* is used before a unit of talk (Example 7). However, rising intonation seems to be a characteristic of these sort of *uhms*. It is as if by using rising intonation, the presenter highlights the fact that the next part is important. Arrow 7 shows an example of an *uhm* before a unit of talk, where there is no intonation contour. In terms of the story, this is less important, as indicated by the faster talk.

d) The final way in which *uhm* can be used to highlight an important point is at the end of a section (Example 40).

Example 40
[Mi:9]

.....↑so::, (.) it accelerates slowly. but¿ as↓ the water is pushed out the end the mass of the rocket is getting less and less, so::, uhm the uh the acceleration, sorry. <the weight of the rocket is falling, and the gravity force drops.> ↑<so it's quite an interesting little system of things going up
→ and down.>↓ (.) **uhm¿** so that's the water thrust phase.

(3.0) ((new image))
t! ↑SO. STARTING RIGHT at the very beginning, we need to answer the question¿ how fast does the water come out of the bottle.↓ now mr benooly¿ back in 1738¿ ↓just to make you feel good that he (.) was a pretty clever sort of fellow¿↑ he developed a thing called benooly's equation¿ ....

Here we can see how *uhm* is used at the end of a section, as part of the resolution of the previous idea. The previous analysis (Chapter 3) showed that *so* marked this resolution phase and now we can see that *uhm* is also commonly found in this environment. In this particular example, *uhm* precedes *so*, although this is not always the case. Although *uhm* is said with rising intonation in this particular example, this is also not always the case.

The following example shows how *uhm* occurs in this environment without *so* (Example 41).

Example 41
[Ph:16]

(1) → ... »**uhm¿** we still have to do the soph- sophisticated statistics¿ but uhm¿ just eyeballing those figures gives you some idea that we <u>think</u> we're on the right track. uhm as far as predicting both
(2) → the the <u>mean</u> and the uhm °the spread of cars.° (4.5) °at least for the queues.° **uhm¿** °°<<queues are actually quite tricky.>>°°

(3.0)
((takes off slide and puts on a new one))
the <u>trav</u>el time wasn't quite so good. for a start we had much less data to work with. so in fact each of the x's on this uhm (5.5) ((walks to other side of OHP and points)) each of the x's on on this one represents uh a data point, and so you can see there are (.) some .....

In this example there are two instances of *uhm* preceding the resolution phase of the section. In both instances *uhm* is said with rising intonation. Arrow 2 seems to confirm the analysis that *uhm* is playing a very specific role in seminar talk. In this case, even though the *uhm* could easily be said at the same volume as the surrounding talk, it is in fact said more loudly than the surrounding talk and with rising intonation. This seems to indicate that its function is quite specific.

The examples in the previous analysis demonstrate how when *uhm* is said with rising intonation it takes on a stronger role. It seems to indicate both that there is more talk to come and that it is in some way important and should be taken note of.

4.3.4 *Uhm* and *uh* within a unit of talk

The most detailed level of structuring that *uhm* and *uh* seem to be able to indicate is actually within units of talk. The definition of discourse markers is that they bracket units of talk, therefore according to the definition, in this position, they should not be classified as discourse markers. However, they seem to be playing a similar function of marking structure, yet at a microlevel. As with the above examples, where *uhm* and *uh* function as discourse markers, these *uhms* and *uhs* are also clearly not part of a repair routine. They occur within a unit of talk, generally before technical type nouns or numbers. They follow the preceding word without a break, as if they are part of the continuing sentence.

The following example illustrates how *uhm* functions in this manner (Example 42).

Example 42
[Mi:9]

(2.5)
°okay?° so::¿ (1.0) and ↑these are basically the different elements contributing to the energy,↓ if you like, of the fluid. this ((points to screen)) is the energy due to pressure¿ this ((points to
(1) → screen)) is the energy due to motion¿ °this ((points to screen)) is **uhm kinetic energy¿**° and this
(2) → is the energy due to positional, or °**uhm potential energy.**° add 'em all together¿ »conservation of energy says they don't change. now viscosity gets into this in a little way¿ you can <take into account viscosity by sticking ((points to screen)) an extra term over here¿> which is
(3) → **uhm the losses** due to viscosity. (.) ((walks back to computer)) °but we won't worry about that.°
(1.5)

The arrows indicate how the presenter uses *uhm* to mark technical type nouns. Although they occur within a unit of talk, these type of *uhms* are not part of a repair routine. There is no evidence of uncertainty of any sort. They seem to be indicating structure at yet another level, at the level of important, technical vocabulary. They are differentiated from marking structure at a higher level in that they are generally not said with rising intonation.

Both *uhm* and *uh* can be used at this deeper level of structuring, although presenters appear to prefer one particle over the other. The following presenter, Roger, tends to use *uh* to mark technical type nouns (Example 43).

Example 43
[Ro:8]

..... uhm¿ ↑it includes a feature to compress the data stream¿↓ based on the mills n w variation¿
(1) → compression¿ uh ↑one really good feature¿↓ which i think almost all **uh vector formats** need
(2) → to have, is the ability to tach attach hyperlinks¿ so just as you get **uh hyperlinks** attached to
(3) → text in h-g and l, you need to have a way to attach a hyperlink to **uh an entity**, a geographic entity being a polygon. so a land parcel you may wish to attach the u-r-l to¿ so that when you click on that object, uh you your browser goes off to a u-r-l °to attach that object.° ↑and that's sort
(4) → of a fundamental↓ **uh paradigm**, that's that's that's based on the web. that things have hyperlinks to other sites. <and so on.> and that concept has °just been added into the drawing web
(5) → format. to include **uh hyperlinks** on vector data. uh° ((looking at OHT)) ↑the drawing web format is just a byte stream¿↓ once you've generated¿ based on a (lump) code¿ followed by additional parameters.....

This example shows how the presenter chooses to mark technical nouns by *uh* (arrows 1-5). However, it is clear that not all technical nouns are marked in this way and it is not necessarily the first instance of the noun that is marked. For example, at arrow 2, the first instance of the noun *hyperlinks* is not marked in any way.

Less frequently, verbs can be marked in a similar way (Example 44).

Example 44
[Ph:8]

..... so if you've got a data base¿ of vector data¿ that describes <points¿ lines¿ and polygons¿ in floating point numbers¿> and you need to get those to the web browser¿ you can forget it °with
(1) → using d-w-f.° you'll need to convert those to integers. and (.) their co-ordinate system **uh** can use
(2) → 32 bit integers which gives you pretty high precision anyway. a 32 bit integer **uhm** translated in geographic co-ordinates¿ as meters on the ground¿ uhm¿ gives you a precision of under a meter. °i think. i remember.° (.) <i tried to work it out before and it's certainly much better than a meter resolution.>.....

In this example, *uh* (arrow 1) and *uhm* (arrow 2) occur before a verb. Once again, they appear to be marking the following word in some way, in that they are said without dysfluency or hesitation. In the few examples of this type of use of *uh* and *uhm*, the verbs following the particle take the primary stress of the tone unit. This is most obvious at arrow 1, where the stress on the verb, *can,* is evident.

4.4 Conclusion

Uhm is a complicated discourse particle to look at, because it operates in a number of different ways and at a number of different levels. The analysis has shown that contrary to popular belief, *uhm* or *uh* should not merely be seen as an annoying mannerism to be avoided at all costs. The data shows that in particular environments *uhm* and *uh* function as discourse markers, with very specific roles within the discourse.

Firstly, as is to be expected, *uhm* and *uh* are used as part of repair routines or as hesitation fillers while the presenter is doing something else. In this role they are generally associated with dysfluencies or uncertainties of some sort. They are often associated with pauses, they may be said quieter than surrounding talk, they are said with no intonation contour, they may be repeated, and they may occur at any position throughout the talk. Both *uhm* and *uh* are used in this way, although *uh* tends to be the preferred choice, particularly for repair. When used in connection with self-correction, *uhm* or *uh* generally function as the initiator of the repair sequence. When used as a filler, *uhm* or *uh* generally indicate that the speaker is temporarily unable to continue, and that when the trouble is dealt with, talk will continue. Although *uhm* and *uh* are often thought of as indicators of dysfluency of speech production, the data indicates that these sort of *uhms* and *uhs* in these seminar talks are in the minority (see Table 2).

Secondly, *uhm* can function as a discourse marker. In this role it seems to mark new, important points. It can do this on a number of levels. All the presenters use *uhm* of this

type to mark the macro-level structure, at the beginning of a section, with some presenters *only* using this marker in this position. It can also be used at a sub-macro-level, following the orientation phrase, to mark points on the overhead slide or in recounting a story. At these two levels, *uhm* indicates both that there is more talk to come and that it is in some way important. It is always said with rising intonation, it is sometimes said louder or with raised pitch, it is often associated with pauses, it is often said while interacting with the overhead slide in some way, either putting it on the pile or on the overhead projector, or adjusting it in some way. It is not associated with taking the slide off.

There are also *uhms* or *uhs* which precede units of talk, yet do not seem to be marking a new point. These *uhms* or *uhs* may be said with rising intonation, but more generally are said with no intonation contour. They are sometimes said more quietly than surrounding talk.

At the end of a section, *uhms or uhs* often precede the resolution sentence. They occur either alone or in conjunction with *so*. They may be said more quietly than preceding talk, along with the resolution sentence. These *uhms or uhs* are said either with rising intonation or with no intonation contour.

Finally, there are *uhms* and *uhs* that occur within the sentence or unit of talk. The sentence is not disrupted by these *uhms* or *uhs,* there being no sign of trouble. They often occur before 'technical' noun phrases, and occasionally before stressed verbs. Both *uhm* and *uh* occur in this position. These *uhms* are never said with rising intonation, and have the same volume as the rest of the sentence.

The above analysis has demonstrated that within scientific seminar talk both *uhm* and *uh* can function as discourse markers. Just as *okay* and *so* are used to indicate the structure of the talk, so too *uhm* and *uh* function in this way. However, whereas *okay* and *so* tend to indicate the macrostructure, giving the overall picture of how the talk is structured, *uhm* and *uh* are interesting in that they function at a number of different levels. At the highest level of structure, *uhm* (less commonly *uh*) functions in a similar fashion to *okay* and *so,* in indicating the macrostructure of the talk. In this case, it is given prominence in terms of volume, pitch, and intonation. The analysis has shown, however, that its function in this position is quite different to *okay* and *so*. As an indicator of macrostructure, *uhm* simply indicates that there is more talk to come and that it should be taken note of. At the next level down, *uhm* (and sometimes *uh*) is used to indicate structure within a section. In this case it is given prominence in terms of intonation and is used to highlight important points within the talk itself. At the next level down, both *uh* and *uhm* indicate the next unit of talk is

about to follow. No prominence is given to *uhm* or *uh* at this level. Finally, both *uh* and *uhm* are used to mark technical nouns.

Chapter 5
Conclusion

5.1 Introduction

The analysis shows that seminar talk, just like conversation, is finely organised talk (Sacks 1984), with the discourse markers *okay*, *so* and *uhm* playing an important structuring role within the seminar. By using the appropriate discourse marker, the presenter is able to organise his/her material into manageable portions or sections, such that the final seminar is a coherent piece of discourse produced by the integration of underlying components of talk. In seminars, as in conversation, discourse markers play a signposting function of letting the audience know what is to follow. But discourse markers do not work alone. Presenters generate structure by the integration of discourse markers with other techniques, such as intonation, volume and pitch, as well as physical action. The main activity in scientific seminar talk involves putting information on the overhead screen, from either the overhead projector or the computer. Through the intergration of verbal and non-verbal discourse, the listening audience has a clear picture of how the talk is progressing. This integration of talk, gesture and graphic representation to indicate the structure of the seminar is in keeping with how scientists generate meaning within a scientific community (Ochs, Gonzales and Jacoby 1996).

The analysis provides insights into the role and function of discourse markers in seminar talk, where they occur, and how they function both singly and in combination. The analysis also provides insights into how scientists communicate within a particular setting, in this case, the seminar presentation. Such analysis has implications for the nature of monologues, which in turn impacts on institutional talk in general. Pedagogical implications for EAP and ESP courses are also important.

5.2 Discourse Markers

Discourse markers do not occur randomly throughout seminar talk. Their distribution is ordered, with each discourse marker occurring in a predictable environment. Analysis of the three most frequently occurring discourse markers indicates that they each play a specific signposting role within the discourse, informing the listening audience about how subsequent talk should be interpreted. This is most apparent at the beginning of a section, where all three discourse markers can occur, either singly or in combination. The most common and effective combination in this position is *okay so*. Its effectiveness is evident in

its ability to close off the previous section or action at the boundary, indicate a readiness to commence the subsequent section, as well as orienting the audience to the topic of the next section. Thus providing the audience with a clear picture of the structure of the talk. The way in which the presenter can use discourse markers to both structure and signpost the talk has been the basis of this research. Analysis of the individual markers highlights the specific function of each marker, and confirms that within a particular environment, each marker retains its function, regardless of the presence or absense of other markers.

Okay has been associated with a closing off function (eg Schegloff and Sacks 1973, 1984; Button 1987, 1990), as well as marking topic shift (Schegloff 1979a, 1986, Beach 1990, Sinclair and Coulthard 1975, Hatch 1992). The current analysis of seminar talk confirms this twofold function of *okay*, as discussed in Beach (1993). The analysis shows how the louder, more prominent *okay* ($okay_2$) 'belongs' to the beginning of the section. In this position it displays both aspects of its twofold function. The first aspect relates to its closing off function, as indicated by falling intonation and an association with taking the slide off the overhead projector. The second aspect relates to its topic shift function, as indicated by louder, more prominent talk and the way in which *okay* generally proceeds immediately to further talk. Further talk may consist of either another discourse marker such as *so*, or the first proposition of the next section. Therefore, $okay_2$ both closes off the previous section and indicates readiness to move onto the next section, with emphasis on the latter rather than the former aspect.

However, *okay* does not always exhibit this second aspect very clearly. There is another type of *okay* ($okay_1$) that also occurs at the boundary. Although $okay_1$ is also said with falling intonation, it is said more quietly than surrounding talk and is generally followed by a pause. This *okay* could be called 'private talk'. It tends to be found following a Q-A exchange or laughter, as the presenter closes off the previous section of talk. $Okay_1$ therefore seems to be connected with the end of the previous section, rather than the beginning of the next section. *Okay* said in this way is very different from the louder, more prominent $okay_2$. Although the twofold function is still present, the emphasis of $okay_1$ is on the first aspect, that of indicating closure of the previous section. This is evidenced by its quietness and the fact that it is followed by a pause. The second aspect, enabling talk to continue, is present in this 'private talk' $okay_1$, but to a lesser degree.

Okay $_1$	*Okay* $_2$
less prominent - quieter	more prominent - louder - raised pitch
'belongs' to end of the section	'belongs' to beginning of the section
followed by a pause	generally not followed by a pause
falling intonation	falling intonation
does not occur in combination	occurs in combination
not associated with taking off slide	associated with taking off slide

Table 1: *Comparison of the two types of* okay *which occur at the boundary.*

Table 1 demonstrates how the two types of *okay* function quite differently at the boundary. The data provides strong evidence for there being two types of *okay*, confirmed by examples showing both types of *okay* in close proximity to each other (see Example 9 and 10 in Chapter 2). The data also provides strong evidence for *okay* playing a double function. It is clear that *okay* does not simply play a closing off role, nor does it simply indicate topic change. For example, *okay* never occurs at the end of a seminar as the final closing off marker. To occur in this position, at the end of a seminar, would indicate that *okay* was *only* playing a closing off function. Similarly, *okay* always occurs with falling intonation at the beginning of a section, yet simultaneously is said with louder, more prominent talk, indicating topic shift. This provides clear evidence for both aspects of its double function.

The occurrence of *okay* is closely linked to the action of taking the old slide off the projector, although it is not solely linked in this way. The analysis shows that most presenters say *okay* as the old slide is removed. This is the minimum that can occur. The old slide is not taken off after *okay* has been said. Different presenters, however, appear to display individual preferences, with some presenters saying *okay* as the old slide is put on the pile or as the new slide is picked up. *Okay* is rarely said as the new slide is put on the overhead projector. We saw how that activity is generally associated with *uhm*. This is not to say that saying *okay* is dependent upon an interaction with the computer mouse or overhead slides. Even when no activity occurs at the boundary, presenters may still say *okay*. However, if there *is* an activity, the saying of *okay* is associated with that activity. This may be clicking on the mouse, taking the old slide off the projector or even putting the old slide on the pile or the new slide on the projector.

Occasionally *okay* can play this double function within a section, to indicate a change in footing. In this case, it is also said with falling intonation. Firstly, it can be used to bracket an important definition or explanation, by marking both beginning and end of the segment. Secondly, it can be used to mark when the presenter wants the audience to understand that

the subsequent talk 'belongs' to someone else. Alternatively within a section, *okay* can be said with rising intonation. In this case it is playing a checking function, often following a segment of complicated talk, with the presenter wishing to ensure that the audience has followed what has been said, before proceeding to the next part.

The analysis also shows that *alright*, *right* and *okay* are functionally similar. Presenters occasionally substitute the discourse markers *alright* or *right* for *okay*, although no presenters use *alright* and *right* exclusively. Some presenters show individual preferences for the use of *alright* or *right* in specific situations. For example, one presenter's use of *alright* is closely connected with clicking on the mouse to change the image on the screen, particularly associated with the end of the video.

So is in some ways more complicated than *okay* in that it functions syntactically as well as pragmatically. Syntactically, it ties adjoining clauses together by conveying the meaning of result. Pragmatically, it functions as a discourse marker, indicating to the audience how the subsequent talk should be interpreted. *So* is also more complicated than *okay*, in that it is position-sensitive. In other words, its discourse marker function varies, depending upon the environment in which it occurs.

The most important position in terms of structure of the seminar is at the beginning of a section. In this position, *so* plays an orienting role of indicating to the audience where the presenter is within the overall structure of the talk. *So* is said with level intonation, followed immediately by an orientation phrase. This orientation phrase can refer backwards, forwards, to the overhead screen, or the presenter can ask a rhetorical question. Following the orientation, the presenter moves straight into the new topic of the section. Because it is at the beginning of a section, *so* is generally said with more prominence than surrounding talk, as evidenced by increased volume or raised pitch. *So* can either occur singly or in combination with other markers in this position. However, regardless of whether it occurs on its own or as a composite, the function of *so* remains the same.

So is also connected with the activity of changing slides at the boundary, although the connection is slightly different than for *okay* and *uhm*. *Okay* is generally associated with taking the old slide off the projector, whereas *uhm* is generally associated with putting the new slide on the projector. In the case of *so*, there is no specific action that occurs at the same time as the marker is actually being said. However, the new image is always on the screen by the end of the orientation phrase, thus ensuring that the image is in place by the time the presenter is ready to begin the new topic.

When *so* occurs in the middle of a section, it functions quite differently. In this position it marks the fact that the following segment of talk should be seen as being parenthetical to the main idea of the section. The presenter temporarily steps out of the main body of talk into a related activity. The related activity, marked by *so*, may be a more detailed explanation of something; it may refer the audience to something on the screen; or it may introduce an example. Prosody may be used to bracket this related activity from the main body of talk. It is within a section that *so's* function as discourse marker contrasts most clearly with the syntactic function of *so*, indicating result, which is also found in this environment.

At the end of a section *so* marks a resolution of an idea or concept. It is often said more quietly than surrounding talk, as well as a little bit faster. *So* can mark resolution at a local level, referring to the content of the preceding section. Such resolutions are generally formulations where the gist of the preceding topic is summarised. Alternatively, *so* can mark a more global resolution by referring to the talk on a metalevel. Global resolutions take the form of assessments, warrants, appreciations, instructions, cautions or back-references to what has already been covered. Some resolutions, for example assessments, are accompanied by a distinctive hand movement. The resolution always ends with falling intonation followed by a pause, before a new section begins with more prominent voice.

The third discourse marker to be looked at was *uhm* or *uh*. This discourse marker is different yet again due to the negative association with its repair or hesitation filler function. As a result, there is social prejudice against using it in seminar talk. The analysis shows, however, that although *uhm* or *uh* can be used to indicate uncertainty or hesitation, it can also function as a discourse marker in seminar talk. When functioning as a discourse marker, it is clearly not indicating dysfluency or uncertainty of speech production, it is playing a completely different role. *Uhm* or *uh* is devoid of syntactic meaning and as a discourse marker it indicates that there is more talk to come. In this role, *uhm* and *uh* function at a number of different levels. At the beginning of a section, it can mark the macro-level of the talk. Within a section, it can mark the sub-macro-level by marking the main points of the talk, or alternatively, it can simply mark tone units. Within a tone unit, it can mark key nouns. The analysis shows how *uhm's* prosodic features are a key indicator of which level of talk is being marked.

When marking the macro-level of the talk, *uhm* occurs in a similar environment to *okay* and *so*, at the beginning of a section. Yet its function is different. In this position, it is saying that there is more talk to come and that it is in some way important and should be taken note of. In this study, it is always said with rising intonation and is followed by a pause. As it is

generally the first word in the section, it is given prominence, as evidenced by louder volume or raised pitch. It may occur singly or in combination. In combination, it either follows *okay* or precedes *so*.[1] *Uhm* can also function at a sub-macro-level to mark the first point of the section following the orientation, to mark points on the overhead or items in the recounting of an event.

These macro-level and sub-macro-level *uhms* are quite distinctive within the discourse. They occur in predictable environments, they are said with prominence and with rising intonation, and are often associated with an interaction with the overhead slide or computer image. Their distinctive features suggest that they do more than simply indicate further talk will follow. They seem to also indicate that the subsequent talk is in some way important, or should be taken note of. They can be associated with the overhead slide in two ways. Either they are associated with putting the new slide on the projector, as occurs at the boundary. Alternatively, they are associated with moving the slide up in order that the information on the screen is more visible. The action generally occurs as *uhm* is said. Although functionally similar, *uhm* and *uh* are not always used interchangeably. In particular, *uh* is seldom said with rising intonation and therefore seldom occurs in this environment. This suggests that it does not play the stronger role of indicating that the subsequent talk is in some way important.

At the next level down, both *uhm* and *uh* mark units of talk. This sort of *uhm* is quite different from the other macro-level and sub-macro-level *uhm.* At this level, both *uhm* and *uh* are said with level intonation, are not said with prominence and are not associated with pauses. They simply occur before a unit of talk, marking the fact that there is more talk to come. At an even lower level, *uhm* or *uh* mark words within a unit of talk, by marking technical type nouns. Just as when marking units of talk, *uhm* or *uh* is said without any discontinuity of talk. They simply occur before some important nouns and occasionally prior to a stressed verb.

It is clear from the analysis that the discourse markers *okay, so* and *uhm* are not simply empty fillers of time while the speaker decides what to say next, as is held by Schourup (1985) and Chaudron and Richards (1986). Each one is clearly playing a very specific function within the discourse. The above analysis accords with the view held by Jucker (1993) and Segel, Duchan and Scott (1991), that discourse markers play a signposting

[1] In Chapter 4 we saw how in seminar talk other combinations of *okay, so* and *uhm* can occur. The analysis of these combinations showed however, that they are not all legitimate. In other words, when *okay, so* and *uhm* function as discourse markers, there are only two legitimate combinations: *okay uhm,* where *okay* is used of the first type, with emphasis on its closing off aspect, and *uhm so*. Where other combinations of *okay, so* and *uhm* occur in seminar talk, they are not functioning as discourse markers in that position.

role, shaping the interpretation of the discourse as it unfolds. They indicate to the audience the shape of the subsequent discourse. For example, when a presenter uses the strong combination *okay so* at the beginning of a section, the audience has a very clear picture of what will happen next. Everything works in combination. The markers are said with prominent voice, they are said following a quieter segment of talk where the previous idea was resolved, and they are often integrated with taking an old slide off the overhead projector. All of this gives a very strong message to the audience. The audience knows that the presenter is about to move onto the next point, as is confirmed by the fact that interruptions predominantly occur at the boundary. If no markers were used at the boundary, the audience would probably still understand that the presenter was about to move onto a new point, although the message might not be as clear. However the data shows that at most boundaries discourse markers *are* present. There are very few examples where no discourse marker occurs at the beginning of a section.

The fact that the presenter can choose which marker to use, knowing that they each mark something different, is confirmed by the fact that markers can occur in combination. The analysis shows how each marker functions singly and that it retains that function when it occurs in combination. It is not the case that the combined new marker acts as a 'compound' discourse marker. This in part deals with the question raised by Flowerdew and Tauroza (1995) as to what is going on when discourse markers occur in combination. They note that combinations occur, but are unsure as to what the combinations mean.

The most frequent and distinctive combination of markers is *okay so*. This combination, in which the individual functions of *okay* and *so* are retained, is the strongest combination in terms of indicating the overall structure of the talk. The fact that it is able to indicate closure of the previous section, readiness to start the next section, and to indicate the orientation of the next section makes it an important marker. When this is further integrated with the physical activity of taking the overhead slide off the projector and putting the new one on, it becomes a powerful method of indicating where the presenter is, within the overall structure of the talk. The audience is left in no doubt as to the intention of the presenter. This contrasts with other possible combinations which use the marker *uhm*. Because the core function of *uhm* simply indicates that more talk is to come, when it occurs in combination with the stronger *okay* or *so*, it does not further strengthen the discourse markers *okay* or *so*. In fact, *uhm* probably plays its strongest role when it occurs singly, when it seems to also indicate that the subsequent talk is in some way important and should be taken note of.

The analysis also throws light on the issue of which words can be members of the core group of discourse markers. Although there is general agreement as to which markers

should be part of the core group, debate about some items still exists. The inclusion of *okay* and *so* seems to be generally accepted (e.g. Flowerdew and Tauroza 1995, Jucker 1993), although Schiffrin (1987) does not include *okay* in her discussion of discourse markers. *Uhm* is more controversial, with no analysts discussing the role of *uhm* as discourse marker. Fraser (1990) clearly excludes words such as *uhm* and *uh* from his core group of ninety-two markers. Yet this thesis has demonstrated that when *uhm* and *uh* are looked at within the context of seminar talk, their function is very similar to the way in which discourse markers function. Therefore in computer science seminar talk, *uhm* and *uh* *are* functioning as discourse markers, and, it could be argued, should be considered as members of the core group of discourse markers. Further analysis is required in order to determine whether *uhm* and *uh* function as discourse markers in other contexts, such as in conversation or other institutional settings.

The other issue which concerns analysts is the identification of a core meaning to which all instances of a particular marker can fit. The polyfunctional nature of discourse markers makes such identification difficult. The analysis shows that discourse markers play an important signposting function, with the nature of that function depending upon their position within the seminar talk. It is this position-sensitive nature of the markers that makes the process of determining a core meaning difficult. For example, incorporating both aspects of the function of *okay* into its overall meaning, permits the possibility of capturing a core meaning of *okay*. However this only accounts for the falling intonation *okay*, which predominantly occurs at the boundary. It does not capture the checking *okay* that occurs with rising intonation within a section. The discourse marker, *uhm*, seems to fare better, with the core meaning indicating that there is more talk to come. Specific instances of *uhm*, such as when it marks macro-level and sub-macro-level structuring, may have the added component of indicating that the subsequent talk is in some way important. However, the core meaning remains central.

So is the most difficult discourse marker with respect to a core meaning. Previous attempts (Schiffrin 1987, Fraser 1990) at finding a core meaning of *so* within conversation, do not seem to be appropriate within the context of seminar talk. Its position-sensitive nature within seminar talk, means that it plays very different functions depending upon where it occurs. At the beginning of a section it orients the listener to what is about to come. In the middle of a section it is used to mark a parenthetical comment, whereas at the end of a section, it is used to mark a resolution. To bring all these different functions together into a core meaning of *so*, runs the risk of losing the advantage of having a precise description of what *so* actually does in the different positions. The resultant over-generalisation would not be advantageous.

The above analysis of the three discourse markers relates to a small scientific community, and any discussions of discourse markers must be interpreted in that light. The discussion is based on how male CSIRO computer scientists use the discourse markers, *okay, so* and *uhm*, in their in-house weekly seminars. Their use may be specific to that community, although the analysis has shown how such use is in general agreement with the way in which discourse markers are used in conversation and other institutional talk. Further research into the role and function of discourse markers is needed to confirm whether these preliminary investigations are generalizable to other contexts.

5.3 Scientific talk

The analysis examines in detail how computer scientists use verbal and non-verbal discourse to organize their seminar talk. In so doing, it adds to knowledge from previous studies (Ochs, Gonzales and Jacoby 1996, Goodwin 1994) that have looked at the way in which scientists in a particular scientific community use a combination of talk, action and activity to communicate meaning. The use of graphic representation is a common component of scientific communication. In the case of computer science seminar talk, visual aids feature prominently, with all presenters using a variety of overhead slides, computer images or videos as an aid to communication. Visual aids, and the way in which presenters organise activity and talk around the visual aids, impact on the structure of the seminar as a whole. The analysis demonstrates that both activity and talk are closely connected, and that any discussion of seminar talk has to recognize the integrative role played by them both. The notion of visual aids as paradiscourse (Coulthard and Montgomery 1985), running parallel to the discourse, fails to fully acknowledge this close connection between talk, action and activity.

All three discourse markers are associated with the use of visual aids in specific ways. *Okay* is connected with taking the slide off the projector. This is most easily seen when the presenter uses actual slides rather than the computer image. When the computer image is used, there is only one action, that of clicking on the mouse. When slides are used, there are four actions: taking the old slide off; putting the old slide on the pile; picking up the new slide; and putting the new slide on the projector. *Okay* is predominantly associated with taking the slide off the projector. The discourse marker *uhm*, on the other hand, is predominantly associated with putting the new slide on the projector. Whenever *uhm* is used at a macro-level or sub-macro-level, either marking a new section or marking a series of points on the overhead, the presenter interacts with the slide in some way. Either a new slide is put on the overhead or the presenter adjusts the already-visible slide. At the

beginning of a section, *so* is also associated with the action of putting the slide on the screen, such that by the time the presenter is ready to start the new topic, the new slide is in place.

Discourse markers frequently accompany an action of some sort throughout the section as well. At the boundary, *okay, uhm* or *so* may be associated with the generation of the new image on the overhead screen. Within a section, *uhm* may be associated with adjusting the slide, before the next point on the overhead is discussed. *So* may be associated with pointing at the overhead screen, for example, when referring to something on the screen or giving an example (see Figure 1 and 2, Chapter 3). In addition, *so* may also be associated with the characteristic hand movement that often occurs during the global resolution (Figure 3 and 4, Chapter 3).

Therefore the connection between discourse markers in seminar talk and their accompanying actions is clear. This connection is most obvious at the beginning of a section, yet it is also evident within a section. As a result, the markers plus the action work together to indicate the structure of the talk to the audience. It confirms the fact that any analysis of scientific talk should take both the verbal and non-verbal into account. By simply concentrating on lower levels of scientific discourse, such as the lexicon or syntactical structure, researchers run the risk of missing out on how *all* levels of discourse work together as a whole to generate meaning. In particular, how scientists take the resourses of everyday language and adapt them to suit their communicative purpose within a specific scientific community (Ochs, Gonzales and Jacoby 1996).

5.4 Seminar talk

The analysis presents a clear picture of the CSIRO computer science seminar, with presenters structuring their material by dividing it into smaller, more manageable segments. We can now describe these more manageable segments, which we heuristically chose to call *sections*, in more detail.

A section consists of a segment of talk bounded by lengthy pauses. The presenter indicates that he or she is at the beginning of a section in a number of ways. Firstly, by use of discourse markers. Discourse markers at the beginning of a section are not simply filling the pause between sections, rather they play a signposting role of indicating to the audience how the subsequent discourse should be interpreted. Secondly, talk at the beginning of a section is more prominent than surrounding talk. Prominence is achieved by increased volume, raised pitch, marked inhalation, and dental clicks. Talk may also be slightly

slower. The discourse marker(s) and the orientation phrase are usually said with prominence, as are the first few tone units of the new topic of the section. Thirdly, slides are generally placed on the overhead screen at the beginning of a section.[2] Following the prominent beginning, pitch and volume return to normal, although within a section, there may be waves of quieter, followed by slightly louder, talk.

The end of a section is marked by reduced volume and faster talk. The section is often concluded by the presenter giving a resolution or summary of preceding talk. This resolution may be local, resolving the topic of the section, or global, most commonly in the form of an assessment. Such resolutions are generally marked by *so* together with some sort of distinctive hand movement. The resolution is generally short and ends with falling intonation. A lengthy pause then ensues.

In Brown and Yule's (1983b) discussion of paratones, they indicate how the final pause, normally exceeding 1 second, is the most consistent paratone-final marker. Chafe's (1979) measurement of the mean length of pauses in his retellings was 4.13 seconds, although his pauses include verbal hesitation markers, such as *uhm* and *uh*. In the data studied here, the pause varies from 1.5 to 6.0 seconds unless the presenter is obviously working on some aspect of the technology. In that case, the pause may be much longer, up to 30 seconds. Pauses between sections are therefore longer than the 'standard maximum' silence in conversation of about 1 second (Jefferson 1989) and between sentence pauses in reading of about 1.0 - 1.24 seconds (Butterworth 1980). Longish pauses therefore can be useful indicators of section boundaries. However, because pauses also occur within sections, care must be taken in simply using pauses as indicators of the end of a section. The end of a section is indicated in a number of ways: reduced pitch and volume; a resolution often marked by *so*; falling intonation on the final word; *plus* a lengthy pause. The old slide may also be removed during this final quieter talk.

Seminar talk can therefore be characterized by a series of sections, divided by lengthy pauses. The role of the pause has been described as being due to processing time caused by speaker difficulty in processing thoughts into on-line speech production (Chafe 1979, Chaudron and Richards 1986, Flowerdew and Tauroza 1995). Evidence for production difficulty is given in terms of the 'hesitation, stumbling and pauses', including *uhms* and *uhs*, which often accompany the transition from one idea to the next (Chafe1979:178).

[2] The frequent use of visual aids is a specific feature of scientific talk. In non-scientific talk, visual aids may not be used so frequently.

However in the current data, we have shown how *uhm* functions at the beginning of a section as a discourse marker. It therefore appears that the role of *uhm* is more complicated than simply being an indication of hesitation or speaker difficulty. *Uhm* in this position indicates that there is more talk to come. The data shows that beginnings of sections in computer science talk are characterized by clear discourse, uncluttered by hesitations, uncertainties, stumblings or elongation of vowels. It may be that the lengthy pause between sections *is* due to processing time, however, the presence of *uhm* in this position cannot be automatically used as evidence to justify such a claim.

The notion of sections with a clear beginning, middle and end, is in keeping with the notion of paratones (Brown and Yule, 1983b) and verbal paragraphs, as discussed by Chafe (1979) and Hinds (1979). The presenters give a verbal equivalent of the paragraph-initial indentation of a written paragraph. Just as a new written paragraph is associated with a new idea, so too is a new section associated with an new idea. Goffman (1981) recognizes this when he mentions how presenters communicate change in footing through cues and markers in speech. A new section is generally associated with a change in footing, in that the presenter is changing his or her alignment or stance towards a proposition.

One important aspect of sections is how both speaker and audience have an understanding of the way in which sections function. Speakers clearly mark the beginning of sections by combining the use of linguistic cues, including syntactic, semantic and phonological, with interaction with visual aids. The ends of sections are similarly marked. But it is not just the speaker who attends to this concept of a section. The audience also understand how sections function in seminar talk because they have shared assumptions about how language, and in particular conversation, works. Members of the audience wait until the presenter resolves a section, moving into faster and quieter talk, before they interrupt. Evidence for this can be seen by the placement of interruptions. As mentioned before, in this particular scientific community interruptions were an acceptable part of seminar talk. However, audience members do not interrupt within a section. Interruptions overwhelmingly occur at the boundary (Example 36, Chapter 3). This is also in keeping with the Grice's (1975) 'co-operative principle', with both presenter and audience aiming to achieve appropriate communicative behaviour.

In terms of the continuum between spoken and written academic discourse, seminar talk has aspects in common with written academic discourse (c.f. Halliday 1985, Chafe 1985, Tannen 1982, 1985). As in written academic discourse, the seminar presenter structures a large mass of material into manageable segments, such that it is understandable by the listening audience. Firstly, seminars are planned in advance, thus resembling written discourse (c.f. Ochs 1979). This is particularly relevant in the case where overhead slides

need to be pre-prepared. Secondly, the audience is given a clear picture of the structure of the talk. The talk is divided into sections which resemble verbal paragraphs. Discourse markers, together with syntactic structure and explicit cohesive ties, show the relationship between what has just been talked about and what is to come. This is very similar to what occurs in written academic discourse. The choice of discourse markers indicates the level of structuring and could be likened to headings in written discourse. For example, the discourse marker composite *okay so*, provides a strong structuring device and is most often used to indicate the macro-structure of a talk. It frequently occurs at the beginning and near the end of a seminar.

A final example near the end of Mark's talk illustrates the way in which the verbal, in particular the discourse markers, and non-verbal work together, to show the beginning, middle and end of a section (Example 1).

Example 1
[Ma:24]

(3.5) ((takes slide off and puts onto pile))
(1) —› ↑ .h **okay.** ((picks up new slide)) **so:** (1.0) ((puts new slide onto OHP. title: "Issues")) just
(2) —› wrapping up¿ some of the **uh** some of the issues↓ are that are sort of foremost¿ are (.) t! ↑the fact that this model is a is a purely descriptive framework. which means it sort of lacks in a sense the ability to °you know° respond to that question,↓ how do i generate a new display. °in response
(3) —› to this problem. so that's sort of a problem.° **uhm¿** (1.0) ((adjusts slide)) t! it also at the moment
(4) —› lacks the ability to compare displays, and say which one's better. and which one's best. **uhm¿** ((adjusts slide)) .h it can sort of say what's different between them, but it doesn't give you a sort
(5) —› of value judgement °**uhm** on them.° .h and **so** if you ↑CAN'T DO EITHER OF THOSE TWO
(6) —› THINGS,↓ what bloody good is it¿ **uhm¿** ((adjusts slide)) t! and how can it be used¿ <well i don't
(7) —› know.> ↑**so** what i need is really to do some more work in producing **uh** (.) either to be able to answer these questions, or produce a convincing argument as to why i don't have to answer these
(8) —› questions.↓ <°let it be somebody elses problem.°> .h **uhm¿** and some of that could be (.) <you
(9) —› know producing methodologies, or tools, based on the model.> **uhm** <°you know to say what it's
(10)—› for.°> .h ↑and of course **uh** i'm always evolving it¿↓ °i've thought of several things i want to add
(11)—› to it since i made that slide up¿ **so** it's ((takes slide off)) always going to be changing.°
(2.5) ((puts slide onto pile))

The example shows a section of talk bounded by pauses, in which there are 15 instances of *okay, so, uhm* and *uh* (marked with arrows and in bold), including *uh* as a repair device (arrows 2, 7), and *so* functioning in its resultative sense (arrows 5, 7). The beginning of the section is evidenced by exchange of overhead slides, more prominent talk, intake of breath and the distinctive discourse marker composite, *okay so* (arrow 1), followed by the orientation, during which the new slide is placed on the overhead projector. As the presenter goes through the points on the overhead he marks them by saying *uhm* with rising intonation, occasionally giving a dental click and adjusting the slide (arrows 3, 4, 6, 8). The louder talk in the middle of the section may seem strange, although it is not unusual to occasionally have louder talk within a section. A section may move in waves, with

maybe one or two instances of quieter talk followed by louder talk. The end of the section is always evidenced by quieter talk, as in this example, where the presenter marks his global resolution comment by *so* (arrow 11). This is then followed by a longish pause, before the process recommences.

The example shows how the discourse markers *okay, so* and *uhm* combine together within a section. At every point within the section, the different discourse markers clearly play different roles. The composite *okay so* is a strong structuring device. In the above example, it indicates to the audience that the talk is almost finished and that the presenter is making his concluding points. The presenter then uses *uhm* to mark the points he wishes to make. The section is concluded when the presenter gives an assessment, marked by *so*.

The example also shows how the presenter combines *all* levels of discourse, including talk, phonology, action and activity, to generate recognizable sections of talk. The occurrence of the discourse markers, *okay, so* and *uhm*, is often associated with the action of moving the overhead slide. *Okay so* is associated with removal of the old slide and ensuring that the new slide is placed on the overhead projector before the end of the orientation. *Uhm* is associated with adjusting the slide as each new point is mentioned. Together with the phonological cues that characterize the beginning and end of a section, discourse markers provide the audience with a clear understanding of the structure of the talk.

5.5 Implications

The above analysis has important implications for everyday conversation, talk in other institutional settings, and the nature of monologues in general. Most importantly it has implications for the second language student. One of the strengths of the conversation analytic method is that it demonstrates the underlying 'technology' of the spoken language by subjecting naturally occurring data to detailed examination. Insights into how a small number of CSIRO computer scientist presenters structure their seminar talks, using talk, action and activity, can throw light on possible ways available to *all* presenters to structure their talks.[3]

The analysis shows how scientists adapt the resources of everyday conversation to meet their specific needs within their specific scientific community. Some adaptations are more

[3] Due to the small-scaled nature of the study within a very specific micro-community, care has to be taken in drawing broad generalisations.

marked than others. The most obvious adaptation is the way in which the composite *okay so* functions. This composite provides a strong structuring device by closing off the previous part, indicating readiness to start the next part, and orienting the audience as to the topic of the new section. It is particularly suited to the extended monologue, especially in the teaching situation. This is important, because the combination of looking-backwards and looking-forwards mimics what occurs in written adacemic discourse, thus situating seminar talk clearly within the academic genre.

Another adaptation which works well in seminar talk is the way in which *so* is used to mark a 'rhetorical question'. In conversation, Schiffrin (1987: 218) noted how *so* functions pragmatically as a turn-transition device. This can be achieved by means of a question marked by *so*. The turn is taken by the next speaker when he/she formulates the answer. In seminar talk, although there is no relevant potential next speaker, the presenter can use a similar question format, marked by *so*. The 'rhetorical question' becomes an orientation device and the 'answer' becomes the new topic. This is a very effective structuring method.

A similar adaptation could be occurring in the case of *uhm. Uhm* in seminar talk could be either simply reflecting the way in which it is used in ordinary conversation or modifying its use in some way. As far as I know, there have been no discussions of *uhm* as a discourse marker in conversation, although studies of repair (Schegloff 1979b, Sacks, Jefferson and Schegloff 1977) have discussed the role played by *uhm* as part of the repair routine. It would be interesting in the light of this study to examine whether *uhm* also functions as a discourse marker in ordinary conversation.

There are also implications for institutional talk. Talk in institutional settings, especially where turn-taking is suspended, requires participants to speak in short monologues. There may be resemblances between how discourse markers are used in such monologues and the structuring role played by discourse markers in seminar talk. This is particularly relevant in the case of academic seminars in different disciplines. It may be, for example, that the use of discourse markers is more common in computer science seminar talk than in other disciplines, for example, social sciences.[4] Other monologues within the academic setting, such as lectures, also need to be examined, as do other languages.[5] Insights into the role and function of discourse markers in seminar talk are therefore important for discussion about discourse markers both in everyday conversation and in institutional talk.

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[4] Personal observation indicates that these markers are used in other disciplines. However, the way in which discourse markers combine with overhead slides is particularly noticeable in a setting like computer science, where visual aids are used frequently.

[5] According to a French speaking computer scientist from CSIRO, *bon alors* is used in French seminar talk in a similar way to *okay so*.

Research into spoken academic discourse is particularly relevant for applied linguists interested in second language issues. Analysis of the role and function of discourse markers in seminar talk provides tertiary level ESL students with important information as to how native speakers use less formal, 'everyday' language to communicate the structure of the extended monologue in the academic setting. Such information has important EAP applications, both in terms of academic speaking for the ESL postgraduate student who is required to present his or her work publicly in the form of seminars, lectures and conference papers and in terms of academic listening.

This analysis adds weight to previous research discussing the role played by discourse markers in lectures and in the classroom situation (e.g. Hansen 1994, Young 1994, Tyler and Bro 1992, Dorr-Bremme 1990), and to research into academic listening which suggests that comprehension of academic lectures by ESL students is improved when discourse markers are used (e.g. Flowerdew and Tauroza 1995, see however, Chaudron and Richards 1986). Pedagogically therefore, it is important that EAP practitioners and EAP course books discuss the role played by discourse markers within the academic monologue. Traditionally, EAP courses have concentrated on how speakers use syntactic phrases in order to orient the listener as to the structure of the talk. However, as we have seen from the analysis, markers such as the composite *okay so* provide strong indications of the overall structure of the talk. It is imperative, therefore, that ESL students be made aware of the way in which discourse markers function within academic monologues. In addition, as mentioned by Flowerdew and Miller (1997:44) it is important that EAP course books incorporate the use of visual aids into their teaching methodology, for as we have seen, discourse markers and the actions associated with the markers are closely linked. This is particularly relevant for the science disciplines for which visual aids are an integral part.

5.6 Conclusion

The above analysis into the role and function of discourse markers in computer science seminar talk, has shown how conversation analysis is a useful technique for analysing naturally occurring data. Discourse markers are widely used by computer scientists in seminar talk as a way of signposting, by indicating the structure of the talk to the audience. However they do not work alone. In combination with intonation, pitch, volume, gesture, and interaction with tools, discourse markers are an available resourse for the presenter to assist in informing the audience as to the structure of the talk. By means of the verbal and the non-verbal, the presenter orchestrates the move from one section to the next. The

precision with which such talk is coordinated with physical activity emphasizes yet again the fact that spoken language cannot be seen as being disorganized, random sounds, unworthy of analysis. The above analysis reiterates the fact that spoken language is finely organized and well-structured discourse.

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Appendix 1
Transcription conventions

.	a stopping fall in tone, not necessarily the end of a sentence
,	continuing intonation, not necessarily between clauses of sentences
?	rising inflection, not necessarily a question
¿	rising intonation weaker than that indicated by a question mark
-	cut-off
t!	dental click
=	connecting talk
< >	talk is faster than surrounding talk
> <	talk is slower than surrounding talk
° °	a passage of talk that is quieter than surrounding talk
SO	a passage of talk that is louder than surrounding talk
↓↑	marked falling and rising shifts in pitch
::	an extension of a sound or syllable
( )	transcription doubt
(( ))	analysts comments
(1.0)	time intervals
(.)	a short untimed pause
»	talk that becomes gradually softer and faster, usually at the end of a section
hh	audible aspirations
.hh	audible inhalations
so	emphasis
[ ] [ ]	overlapping utterances or actions
—›	a marker to indicate something of importance
okay	bold type to emphasize important words
OHP	overhead projector
Pres:	presenter
Aud:	member of the audience
Action:	line in the transcript indicating what the presenter is doing while he talks
Screen:	line in the transcripts indicating what is happening on the screen while the presenter talks

The transcript notation was developed by G. Jefferson. For the purposes of this thesis, a few additional notations have been used. A more detailed explanation of the transcription conventions can be found in Button and Lee (1987) or Atkinson and Heritage (1984).